ELECTRICAL SOUTH

MAY
1943

52-In Hotel Type

FANS by HUNTER-CENTURY

55th SEASON

HUNTER, who has made fans and ventilators exclusively during 55 years, is now operating under War Production Board restrictions. • No more fans will be made except for the Army, Navy and Maritime Commission. • HUNTER unfilled orders now on hand represent contracts with Government Agencies. • Certain sizes of belted exhaust types can be made available for Government hospitals and other war industries, subject to limited material inventories now on hand.

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"GLAMOR GLASS" for fighting light

● There is glamor in the glass that houses the electronic miracle of fluorescent lamps. These long light sources provide the cool, shadowless, glarefree illumination that works a "charm" in speeding war production in plants all over America.

There is glamor, too, in the careful "beauty salon" treatment of glass at Sylvania. Before acceptance it undergoes 16 different inspections for possible imperfections. It is handled with gloves — to avoid possible contamination from contact with human hands. It is even washed, dried, brushed, and vacuum-cleaned in air-conditioned rooms.

Sylvania "glamor glass," like the development of the "Mercury Bomb" method of precise mercury measurement, is a formula that conserves vital metals for war. But all the material and process changes, made continually at Sylvania, must and do step up fluorescent performance and effect important economies.*

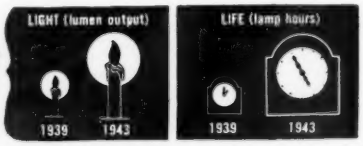
It is because of Sylvania's many years of independent and aggressive research that fluorescent, today the best industrial lighting, is destined to light our homes, offices and stores when Victory is won.

To obtain research dividends of more light output, longer life and uniform color, specify Sylvania Fluorescent Lamps — each one better than the last — for replacements.

SELL SYLVANIA AND GIVE YOUR CUSTOMERS FAR MORE LIGHT AND LIFE FOR THEIR MONEY

*Compared with 1939 a dollar invested today in Sylvania Fluorescent Lamps buys more than four times the lumen output and approximately five times the lamp life.

SYLVANIA FLUORESCENT DOLLAR BUYS:



(Based on decreasing price and increasing efficiency and durability of Sylvania 40-Watt White Fluorescent Lamp)

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ELECTRIC PRODUCTS INC.

Formerly Hygrade Sylvania Corporation
Salem, Mass.

Incandescent Lamps, Fluorescent Lamps, Fixtures and Accessories, Radio Tubes, Electronic Devices.

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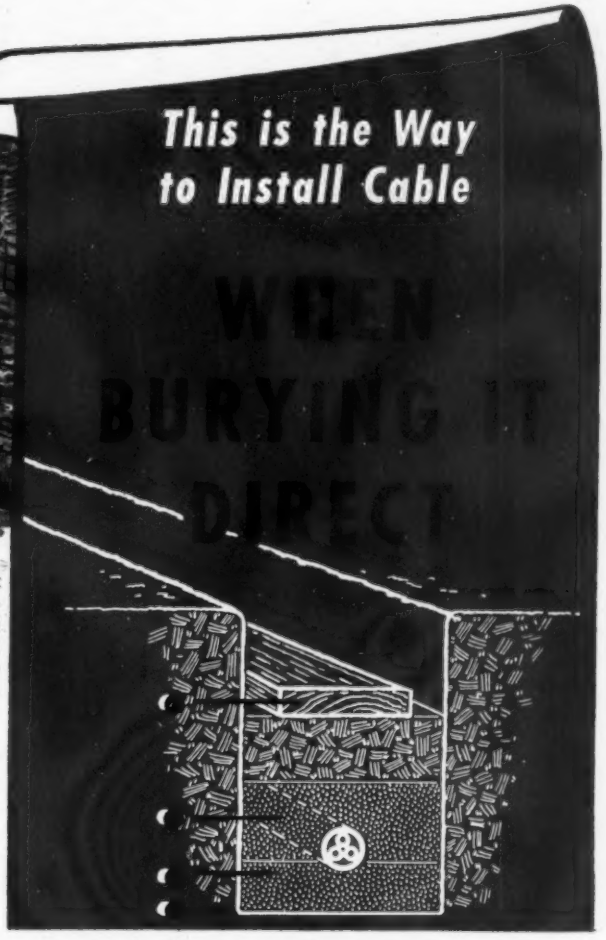
Volume 23 Number 5

This is the Way to Install Cable

WHEN BURYING IT DIRECT



While certain types of underground cable for direct burial are often plowed in, when installing the more expensive high tension cables, or cables for extremely critical circuits, further precautions will prolong their useful life and prevent service interruptions caused by mechanical damage, regardless of the type of insulation and covering used.

HERE'S HOW IT'S DONE:

1. Dig trench deep enough (at least 18-in.), so cable will not be disturbed by plowing, surface digging or paving excavation.

2. It is preferable to lay a sand cushion, or at least have base of trench loosened so it is cleared of rocks and other rough projections.

3. After laying cable and before backfilling, cover it with soft earth or sand, free from stones, rocks, etc., so they won't press against the cable when flooding or frost-heaving disturbs the surrounding earth.

4. A creosoted plank or concrete slab, laid six to eight inches above the cable, gives additional protection and warns workmen of its presence when digging over the cable.

Under highways and railroad rights-of-way, it is usually best to pull the cable through a pipe or conduit.

Such protection is particularly desirable for non-metallic underground cable. But even when metallic-armored (steel taped, etc.) cable is used, it is desirable to have this more complete protection. Naturally, the extent of protection depends upon the type of soil as well as the likelihood of disturbance, such as in urban areas where the majority of digging and excavating occurs.

Here's why these preventative measures increase the life of cable:

a Rocks and other sharp projections will not bruise or deform the cable insulation if extraordinary pressures develop.

b Better packing permits improved heat dissipation and paves the way for longer cable life and greater efficiency.

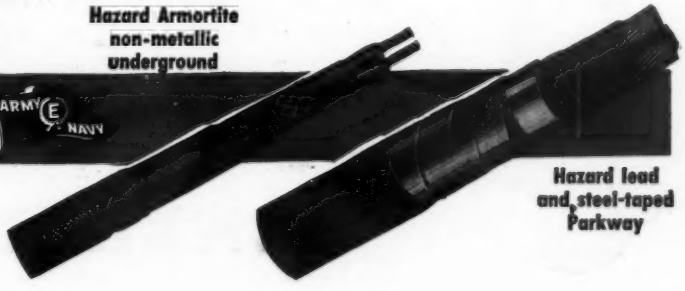
Hazard engineers are experts in the production, installation and maintenance of electrical wires and cables. Why not consult them about *any* cable problem?

Even the best installation practice does not help much unless the original cable is properly designed. To relieve any doubt specify:

HAZARD INSULATED WIRE WORKS
DIVISION OF THE OKONITE COMPANY
Works: Wilkes-Barre, Pennsylvania
Offices in Principal Cities

3226

Hazard Armortite non-metallic underground



Hazard lead and steel-taped Parkway

HAZARD

ARMY E NAVY

Electrical Wires and Cables

18 War Production Men report what happened *when lighting was improved**

GREATER ACCURACY

SHELL FUSE manufacturer: Production increases of from 25 to 50 per cent as result of better inspection and more efficient machine operation.

MOTOR TRUCK manufacturer: Workmen read micrometers and scales more accurately.

TEXTILE manufacturer: Better Lighting a great aid in color matching.

LESS SPOILAGE

ROLLER BEARING manufacturer: Grinder operators spot improper grinder performance more quickly and can correct it before work is spoiled.

ELECTRICAL EQUIPMENT manufacturer: Better lighting accompanied by five per cent reduction in errors.

FACTORY OFFICE: Reduction in office errors as result of lighting.

FASTER SEEING

HEAVY MACHINE TOOL BUILDER: Better lighting reduces time required to rebuild a machine.

ELECTRICAL EQUIPMENT manufacturer: Time required for machine set-ups reduced.

AIRCRAFT PARTS manufacturer: Less time lost by workmen hunting for tools.

EASIER SEEING

LAMP manufacturer: Time for training new women operators greatly reduced.

SMALL MACHINE PARTS: Men can read scales and blueprints more easily at night than by daylight.

FACTORY OFFICE staff: Unable to keep up with increased work under old lighting, but now work is done without undue effort.

INCREASED SAFETY

ORDNANCE PLANT: Increased safety, especially when breaking in new labor.

SHIP BUILDER: New lighting reduced blinding effect of flashes from welding torches.

TEXTILE manufacturer: Decreased fire-hazard.

DECREASED FATIGUE

MACHINE PARTS manufacturer: Men on night shift gained weight.

AIRPLANE PARTS manufacturer: Morale improved; fewer yard fights.

AIRPLANE PARTS manufacturer: Fewer headaches; aspirin tablet consumption decreased from 1000 to 600 tablets per month.

What are you doing?

The 18 comments summarized on this page are typical of the wide range of benefits resulting from lighting improvements.

They are typical of the kind of results lighting men can and are getting when they check up on war plant lighting and suggest simple changes to correct lighting bottlenecks—changes that require a minimum use of critical materials.

To date these lighting men—the representatives of electric service companies, electrical wholesalers, and contractors, lighting equipment manufacturers—have barely scratched the surface of this job that's so important to the war effort.

What are you doing in your own territory, for example, to help newly converted war plants and shops speed production with better light?

General Electric Company, Nela Park, Cleveland, O.

* *These reports are the result of a survey of war plants made under the direction of a special committee of the Illuminating Engineering Society, a non-profit professional organization of the nation's leading lighting authorities. Interviews were made by teachers of illuminating engineering of five leading technical colleges.*

G-E MAZDA LAMPS

GENERAL ELECTRIC

—Like the
HUBBARD AUTOGAP Lightning Arrester
"Shoots Out" a follow-up arc

In Texas and other oil districts, when a well takes fire, a famous firm of oil field fire fighters is called in to extinguish the blaze. This is often accomplished by "shooting out" the blast after wreckage has been cleared and the fire confined to the smallest possible area, usually the jet emitted from the top of the casing. "Shooting out" consists of placing at the casing, a heavy charge of gelatinous nitroglycerine which, when exploded, destroys contact between the gases and the flames so that the continuous feed of combustible material to the point of ignition is interrupted. There is much more to the trick, but in principle, that is the process.

Hubbard *Autogap* Lightning Arresters employ exactly the same principle, but the "fire" in this case, is electrical, and the dissipating force is supplied automatically by the passage of the current through the arrester. When the current is forced around core "A" and through the minute clearances "B" to reach ground, the confinement and the contact with the fiber surfaces causes an explosion. The gases generated are exhausted simultaneously in opposite directions through vents. The follow-up arc is "shot out" just as the nitroglycerine explosion snuffs out a burning oil well.

For detailed data and diagrams write for an illustrated "Autogap" bulletin containing operating data, installation methods, results of tests and other pertinent information.

HUBBARD AND COMPANY
PITTSBURGH . . . OAKLAND CALIFORNIA . . . CHICAGO

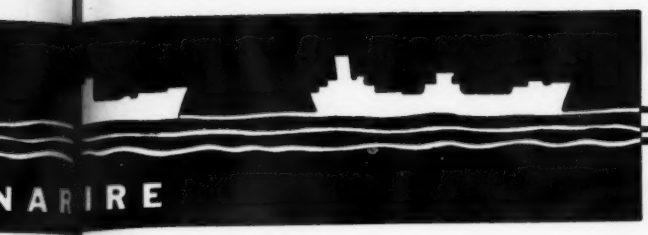
U. S. Rubber Laytex Army Assault Wire requires only one-fifth the shipping space of ordinary communication wire ...releases four times the room for men, material, food for overseas.

Light, strong and plenty tough, Laytex is the most flexible of all insulation for electrical conductors. It is waterproof, resists wide-range temperature changes...and will not shatter under concussion. Conductors are perfectly centered...because the unique Laytex Process applies the purified insulation in liquid form.

Laytex Assault Wire meets every basic requirement of the Armed Forces. It weighs less than 30 pounds per mile twisted pair; has a breaking strength of 50 pounds per conductor; a talking distance of five miles. Millions of feet of Laytex Assault Wire are now on active duty wherever American Armies are in the field.

1230 Sixth Ave. Rockefeller Center

UNITED STATES



ONE SHIP FOR
U. S. LAYTEX ASSAULT WIRE

IN PACE REQUIRED FOR
te SSAULT WIRE

Laytex U. S. PAT. OFF

ASSAULT WIRE MEETS EVERY BASIC MILITARY REQUIREMENT

Rockefeller Center • New York

UBBER COMPANY

"Tomorrow may be too late—do it today!"...CHECK UP!

THIS

ELECTRICAL FAILURE HALTS WAR PRODUCTION

MIGHT HAVE PREVENTED

THIS

WARTIME restrictions make copper products hard to get — this includes electrical wire and cable. It will pay you to protect what you have.

Anaconda's Preventive Maintenance Plan will help you check to see that cables in your plant are not being abused.

If you follow this free plan you not only help yourself, but more important, you help the war effort. This manual provides a practical automatic method for complete analysis of circuits and equipment... uncovers potential weaknesses ... methods for correcting them... with charts to enable quick periodic check-ups.

NOTE: Through this Preventive Maintenance Plan you may uncover the evidence necessary to obtain an "emergency repair priority." This is explained fully in the plan book.

ANACONDA'S PREVENTIVE MAINTENANCE PLAN

ANACONDA

Anaconda Wire & Cable Company
25 Broadway, New York City

Please send copy of the Anaconda Preventive Maintenance Plan for safeguarding production.

Individual .....

Company .....

Address ..... City .....

S-H

MAY, 1943

Volume 23 No. 5

ELECTRICAL SOUTH

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Manager

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Production Manager

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ATLANTA, GEORGIA

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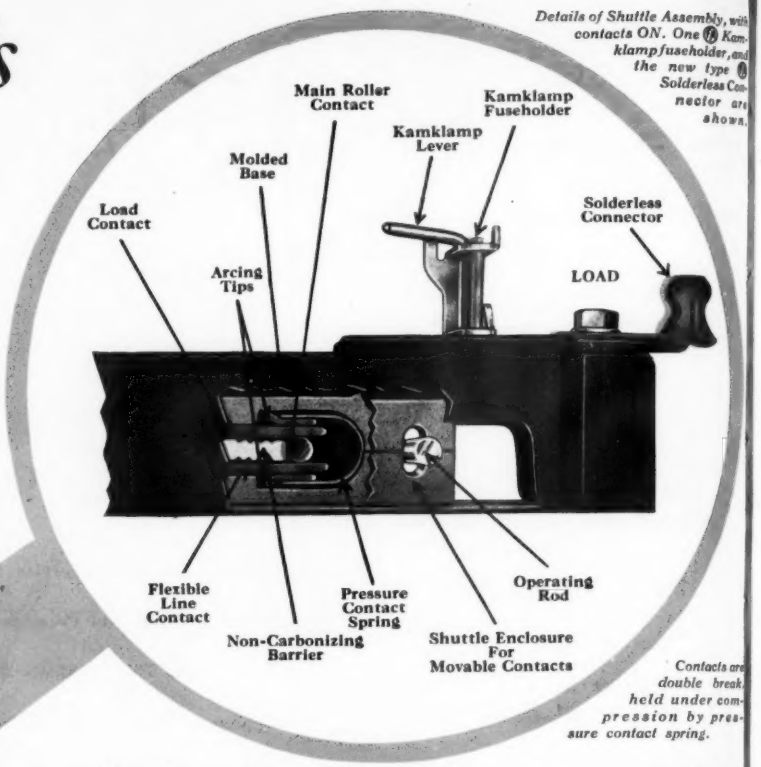
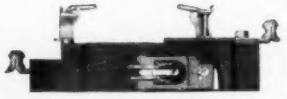
Thousands of these *Safety Switches* are helping produce War Materials..



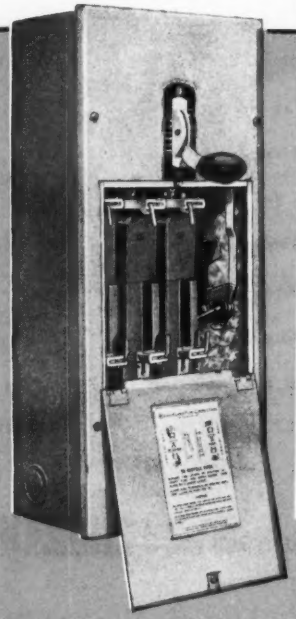
Details of Shuttle Assembly, with contacts ON. One (FA) Kamklamp fuseholder, and the new type (FA) Solderless Connector are shown.

Contacts are double break, held under compression by pressure contact spring.

Contacts in OFF position.



Contacts in MAKE or BREAK position.



100 Amp., 575 Volt (FA) SHUTLBRAK Switch, Cat. No. SA-10633.

Some are used singly — others are banked in groups — or assembled in well-designed switchboards and panelboards. Still others are installed as Plugin Units for (FA) Busduct. But wherever and however it is used, this heavy duty industrial

(FA) SHUTLBRAK SWITCH

is giving efficient, dependable service on motor circuits — at service entrance — and on installations requiring an operating switch.

The (FA) Shutlbrak Switch is revolutionary in design. The contacts are *shuttled* on and off.

The roller type main contact and auxiliary contacts are enclosed in an insulated shuttle. This shuttle assembly in turn is entirely surrounded by insulating material. There is an arc resisting barrier at all times between the line and load contacts—and contacts are held under compression in ON position. Silver plated current carrying parts insure low resistance. Properly engineered springs assure quick make and quick break. It is equipped with (FA) Kamklamp (pressure type) fuseholders for either ferrule or knife-blade types of fuse terminals, and with the new (FA) Solderless Type Pressure Connectors.

As an additional safety factor, Type A is equipped with an interlocking arrangement between the switch operating lever and the door of the fuse compartment. The door cannot be opened when the handle is in the ON position. (Type B does not have this interlocking feature.)

(FA) Shutlbrak Switches are available for both surface and flush mounting. Enclosures have ample wiring space at top, and AT REAR of the switching mechanism. Fronts and cabinets are attractively finished in pearl gray enamel.

Capacities: 30 to 1200 amp., inclusive, for 250 volts AC or DC, and 30 to 600 amp., 575 volts AC, in 2, 3 and 4 poles. Approved by Underwriters' Laboratories, Inc.

For detailed information, and suggested specifications for (FA) Shutlbrak Switches, Panelboards and Switchboards, write for Bulletin No. 59 . . . Frank Adam Electric Company, St. Louis, Mo.

EST. 1891 — THE SIGN OF A BETTER JOB

Frank Adam

ELECTRICAL PRODUCTS for War Industry

FRANK ADAM ELECTRIC CO. ST. LOUIS, MO. U.S.A.

ELECTRICAL SOUTH

MAY, 1943

Customer Service Program

Nearly 8,000 customer interviews per month are being made by Georgia Power Company in three-point program designed to help electric customers with their wartime problems.

By Donald L. Moore

THROUGH its new customer service program, the Georgia Power Company is accomplishing its three-fold objectives, according to Charles A. Collier, vice-president. The program was started in February after the staff of 54 customer service representatives had been given special training in three-day schools in January. As outlined in the employe booklet on the aims, methods and benefits of the new program, the objectives are:

"1. To help each electric customer make the most satisfactory use of his electric service and equipment.

"2. To keep him satisfied with our service by discovering and removing causes of dissatisfaction;

"3. To win and maintain his good-will for the company."

The services rendered by the 54 new customer service representatives and the 50 home economists for the company's residential customers during the short month of February, indicate progress in attaining the three objectives, Mr. Collier pointed out.

February reports showed that 7,778 customer interviews had been made by the 104 home service and customer service representatives. These resulted in instructions being given in the care and use of 9,817 appliances—and to 5,389 customers on fuse renewal. The utility men and women, most of them former merchandise salespeople, repaired 2,699 appliances in the homes of customers and made 760 appliance repair orders. The representatives listed 113 used appliances for sale by customers, and 304 appliances that customers wanted to buy. A total of 262 complaints were received and handled by the representatives, or through them by employes in other departments.

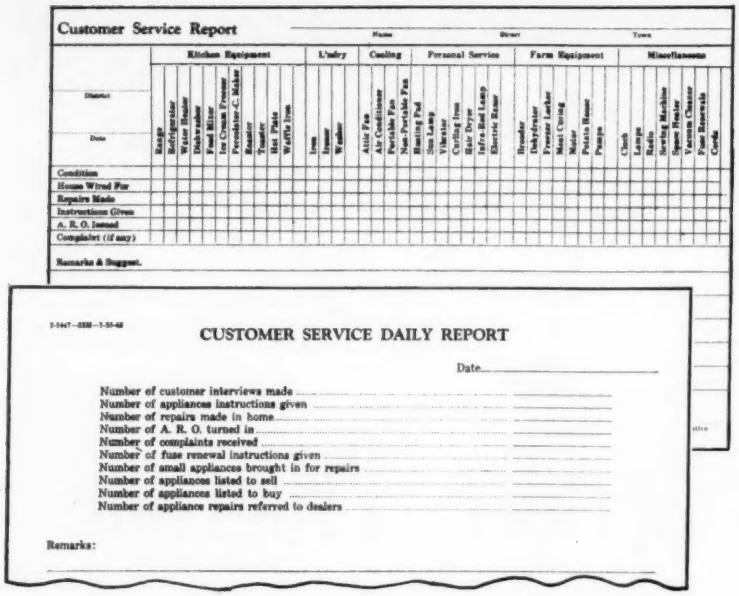
The Home Service Division in February also reported 2,707 homes checked on lighting and 507 on wiring. Planned kitchens were discussed in 804 homes, and nutrition information was given in 2,811.

In addition to home-call work, the home service representatives conducted many group lecture-demonstrations. Sixty-two were held for 1,672 people during February. Subjects included nutrition, Health for Victory Clubs, platform home call, canteen, lighting and point rationing.

In commenting on the needs for the new customer program, Mr. Collier said: "The responsibilities of those who stay on the home front to keep the company operating are multiplied many times over by the war. In order that war goods may be produced and essential civilian services maintained, our responsibility to the individual customer increases immeasurably. Despite all the wartime difficulties, we must maintain adequate service.

"Our new Customer Service Program is one which we believe would be desirable and helpful at any time, both to the company and the customers. But at this time when we and our customers are sharing common problems resulting from the war, our new program is needed to help both in solving those problems."

By words of gratitude to the customer service representatives after



Customer Service Report

Name Street Town

Kitchen Equipment: Range, Refrigerator, Water Heater, Dishwasher, Food Mixer, Ice Cream Freezer, Ice Cream C. Mixer, Roaster, Toaster, Hot Plate, Waffle Iron

Laundry: Iron, Ironer, Washer

Cooling: Attic Fan, Air Conditioner, Portable Fan, Heat Portable Pad, Sun Lamp, Vibrator, Curling Iron, Hair Dryer, Infra Red Lamp, Electric Razor

Personal Service: Brooder, Dehydrator, Freezer Locker, Meat Curing, Motor, Potato Hoist, Pumps

Farm Equipment: Clock, Lamps, Radio, Sewing Machine, Space Heater, Vacuum Cleaner, Fans, Reversals, Cords

Miscellaneous

Date

Condition

House Wired For

Repairs Made

Instructions Given

A. R. O. Issued

Complaint (if any)

Remarks & Suggest.

CUSTOMER SERVICE DAILY REPORT

Date

Number of customer interviews made

Number of appliances instructions given

Number of repairs made in home

Number of A. R. O. turned in

Number of complaints received

Number of fuse renewal instructions given

Number of small appliances brought in for repairs

Number of appliances listed to sell

Number of appliances listed to buy

Number of appliance repairs referred to dealers

Remarks:

Forms used to record customer service program data.

they complete their check-up of appliances and electric service in homes, and by letters and remarks to Georgia Power Company officials, new and old customers show their appreciation for this free help.

"I want you to know how very much the customer service is appreciated," wrote one woman, reflecting the sentiments expressed by hundreds of others to the company representatives.

One customer from Australia said that "this is the only country that would give this kind of service."

"That is some service you folks are giving," said another. "I had an old lamp that I had set aside, for I thought it could not be repaired. This man fixed it for me and checked all my other appliances. And when I found that there was no charge for this service, I just couldn't believe it. I have lived in 10 states and never have I heard of anything to equal this. I think your Company is doing a wonderful service in rendering its customers this service, especially at this crucial time, and I want to thank you for it!"

On each home call, the customer service representative makes a customer report. In it he details what he did for the customer to help her with her electric equipment and service. Equipment is grouped under such classification as: kitchen equipment, laundry, cooling, personal service, farm equipment, and miscellaneous. Under each appliance, space is provided to indicate condition, repairs made, instructions given, repair order issued, complaint, and remarks and suggestions. Whether a house is wired for range, water heater, and/or pump, also is recorded.

Each day, the representative makes a summary report of the calls he made that day and his accomplishments. These daily reports, in turn, are used in preparing a consolidated monthly report for each of the company's six operating divisions.

The Appliance Exchange Information Service offered by the Georgia utility is proving a popular adjunct to the service program. This feature has been promoted by publicity in the company's new monthly bill stuffer, rural magazine, industrial-commercial magazine, Atlanta street-car leaflet, radio announcements and newspaper advertisements as has the whole program.

Records are maintained in each of the company's 84 stores of appliances people want to buy or have to sell. Needless to say, the number of appliances wanted exceed those for sale, especially in the case of such helpful ones as washers, refrigerators, mixers and and irons.

Advertising of the new personal services provided its residential customers was not begun by the Georgia utility until about a month after the trained men and women got started in their new line of work. A series of five quarter-page advertisements were run on a weekly schedule in daily newspapers. Smaller versions of three of the ads were run in weekly newspapers in the company's territory.

The ad copy was restrained in offering the immediate free help

(*Continued on page 80*)

Typical of the services being rendered by employees in Gorgia Power Company's Customer Service Program: instructions in care of appliances, how to repair appliances, and how to change fuses.

Utility Wartime Aid Program Benefits Army and Navy

By R. M. Grogan*

THE UTILITY industry has converted its services to the war effort quietly, efficiently and to such a degree that it is considered to be an essential war industry. In addition to the all-out effort being rendered to other war industries and despite the drain of man power from its ranks, the utility industry has entered wholeheartedly and without publicity into a program of cooperation with the War Production Board, the Army, and the Navy. This is called the "Utilities War Time Aid Program."

This Utilities War Time Aid Program is a nation-wide effort on the part of the utility companies to contribute to the war effort by giving the United States Army and Navy the benefit of their vast experience and resources in the operation, maintenance and repair of electrical distribution systems.

Program Objectives

This program is concerned with the safe, efficient operation of the electrical distribution systems in the various Army and Navy posts and bases, so that no time will be lost in the vital training of the armed forces at these posts and bases due to lack of lighting or power facilities. In addition, the program is concerned with the rapid restoration to service of the electrical distribution systems in the posts and bases following disruption due to accidents, storms, or aerial bombings, so that the safety of the post or base, and the safety of the area which it guards, will not be jeopardized.

The program takes the practical form of making calls upon the Army and Navy officers charged with the operation of the electrical systems in the posts or bases and reviewing with them the power supply facilities, the possible alternate supply sources, the available sources of engineering advice, the stocks of utility materials and the utility equipment, and the personnel and facilities available to render aid in restoring the post system to service in case of disruption. The results of these visits are then recorded in the form of a report and handed to the chief of the respective branch of the service involved as a guide in utilizing the active cooperation of each utility company.

The War Production Board is vitally interested in the conservation of critical materials. The Utilities War Time Aid Program aids this cause by making the stocks of the utility companies available to the Army posts in time of emergency thus eliminating the need for each Army post to carry a large stock of surplus critical material. The Utilities and Repairs Branch of the Corps of Engineers of the Army desires, and makes every effort to utilize, suitable means to operate the Army posts at their greatest economy and efficiency. The Utilities War Time Aid Program is designed to help the Army do this job.

To date the program has been confined to Army posts; but the Navy, after surveying the reports and the results of the program, has requested that it be included in the program. Plans are now being made to extend the program to the Navy establishments as rapidly as possible.

This program is, as noted before, concerned with operation and maintenance only. Construction work is beyond the scope of the program as the program is not intended to usurp the field of, or to compete with, the private contractor or the consulting engineer.

The program is under the general direction of D. A. Sullivan, power consultant, of Commonwealth Edison Company, in Chicago, Illinois. Mr. Sullivan originated the program in the area around Chicago with the aid and cooperation of the various utility companies involved. Visits were made to U. S. Army posts in the area and a report written and submitted to the U. S. Army Corps of Engineers. This report, which set out in detail the degree of cooperation with the Army offered by each utility company and the benefits to be derived from such cooperation, was received with much favor by the U. S. Army and was described as a valuable contribution to the war effort.

Program Now Nationwide

The possibilities of the program were so self evident that the War Production Board and the Army requested that it be expanded and organized on a nation-wide basis. Mr. Sullivan was appointed special power consultant and coordinator for the Army and then proceeded to expand the program, with the wholehearted cooperation of the various utility companies, into a nation-wide program. Mr. Sullivan has done an outstanding job in organizing this program with the result that practically every operating electric utility in the United States is now participating in the program.

In setting up the program on a nation-wide basis it was obvious that certain utility companies, centrally located in their areas, would have to act in a coordinating capacity for all the companies

*Mr. Grogan is distribution engineer for the Alabama Power Company, Birmingham. This article is adapted from a paper presented before the Engineering and Operations Section of the Southeastern Electric Exchange, in Atlanta, March 25 and 26, 1943.

in the area. The area coordinated by each one of these "coordinating companies'" corresponds roughly to one of the various service command areas (formerly called Corps Areas) of the U. S. Army. Finally, each of the coordinating companies was asked to appoint and to loan the services of a coordinator who would present the program to the other utility companies in the area and, in company with their representatives, visit all the U. S. Army Posts in the area and present the program in turn to the Army officers operating the post electrical systems.

As finally set up in working form in the summer of 1942, nine companies were selected as coordinators in the respective Army Service Command areas in the country, among them being the Alabama Power Company.

The area assigned to the Alabama Power Company to coordinate under the program consisted of that part of the U. S. Army 4th Service Command located in the States of Alabama and Mississippi, and in the portion of the State of Florida west of the Chattahoochee River; but excluding the service areas of the Tennessee Valley Authority and the Rural Electrification Authority. There are five other utility companies in this area besides the Alabama Power Company; namely, Florida Public Utilities Company, Gulf Power Company, Mississippi Power Company, Mississippi Power and Light Company, and Birmingham Electric Company. The efforts of all these companies were coordinated through the Alabama Power Company, but each individual company made its own decision as to the degree of cooperation it found possible to offer. It is hardly necessary to say that each of the companies named above entered into the program willingly to the extent of its ability.

Located in the area served by Alabama Power Company are more than 25 Army posts, either in operation or in process of construction. The number of Army posts in this area is another indication that the South is coming into its own in this war period because of its climate, its abundant material resources and the availability of electric power.

The Army posts, located in the service areas of the six utility companies mentioned, were visited by the coordinator loaned by the Alabama Power Company along with representatives of the respective utility company in whose service areas the posts were located; and the program was presented to the respective post engineers, who are the officers in charge of the electrical facilities of the posts. These visits usually turned into cordial, informal round table discussions of operating problems. The officers and civilian operating personnel of these posts were outspoken in praise of the cooperation already given them by the utility company serving them. As one officer put it, "Starting a program of cooperation between us now is a little late, because we've had your cooperation and have relied on you fellows ever since we started this post."

These visits to the Army posts were started off with a brief description of the electric service facilities supplying the post including a brief resume of the system of the utility company concerned. The discussion was then broadened out into a description of the available power supply from the interconnected transmission systems in the area. These descriptions, with attendant maps, proved to be an excellent means of starting the visits off on an informal basis. Of help also was the knowledge gained beforehand of the operating personnel of each post, and of any peculiar problems which existed.

Listed below are the aids that one utility company, namely, the Alabama Power Company, offers to Army posts in its service area under the Utilities War Time Aid Program. Note that this program stresses operation and safety under normal operating conditions and aid in restoring service in emergencies.

Assistance in the safe operation of Army posts' overhead electrical distribution system consisting of:

(1.) The giving of technical advice concerning the operation, maintenance, and repair of the system. This includes advice on fuse coordination work; advice on load balancing or in the planning of load or voltage studies; advice as to inspection of transformers, poles, etc.; aid in preparing for blackouts; advice on transformer tap settings; advice on preparation of operating procedures; and advice on similar problems that are peculiar to the operation of an overhead electrical distribution system.

(2.) The repairing of failed transformers, oil circuit breakers, and large equipment at the North Birmingham Shops of Alabama Power Company. Because of material restrictions, such reparis are contingent upon the post furnishing priority assistance to enable replacement of materials used in repair work. This repair work is to be done at actual cost, including normal overhead charges.

(3.) The supplying of a capable man to give post linemen some training in proper methods of line work as practiced by utilities. This man would also demonstrate the use of rubber protective equipment for working lines "hot."

(4.) The supplying of a man to give safety talks and to demonstrate artificial respiration, either pole top or prone pressure method.

(5.) The making of periodic tests on rubber gloves and rubber goods at cost.

(6.) The rendering of advice in cases of radio interference affecting the main U. S. Army radio communication set of the post.

(7.) The rendering of technical advice in case of trouble on large refrigeration installations (i.e., large meat boxes, etc.).

Assistance in cases of emergencies disrupting post electrical distribution system (storm damage, accidents, bomb damage, etc.):

(1.) Alabama Power Company will attempt to locate and provide the post with materials needed to restore service. If such materials are on surplus stock list, they can be sold to the post after War Production Board approval. If such materials are not surplus, Alabama Power Company will supply them for a reasonable period of time until the post is able to purchase replacement material.

(2.) Line crew or crews, complete with trucks and tools, will be available to the post engineer on a cost basis to help restore service in the post area. Such crew or crews are to be operated by Alabama Power Company under its own working policies and conditions.

(3.) The facilities of the North Birmingham Shops will be available for repair of damaged equipment. These repairs are to be made at actual cost, including normal overhead charges.

All references to "electrical distribution systems" in these lists of aids are confined to exterior wiring alone; no reference being made to interior wiring.

In addition, since the Alabama Power Company has available a man experienced in the operation and maintenance of water supply systems, technical advice concern-

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Women Can Handle Men's Work Utility Experience Indicates

By T. A. Busby*

SERIOUS man-power shortages, arising principally in areas devoting their principal manufacturing and industrial efforts to war production, has led to widespread employment of women in work formerly marked for "men only." The necessity of training, equipping, and putting into the field eight to ten million men in our armed forces and sustaining them requires utilization of all available supplies of labor. War Manpower Commissioner McNutt recently predicted that by the end of 1943 at least 18,000,000 women would be employed in business and industry in the United States.

As the employment of women for many jobs formerly filled by men is a new venture for most utility companies, information on the special problems involved is of interest. Selection, training and adaptability of women to various tasks are problems confronting most companies today and the necessity of employment of women as replacements for men will grow as the number of men in our armed forces increase.

A critical labor shortage has existed in Charleston, S. C., since early in 1942. Expansion of shipbuilding facilities at the Charleston Navy Yard and other shipyards resulted in employment of all available local labor and bringing thousands of workers to Charleston from other parts of the country. Since the 1940 census this area has more than doubled in population and the construction of housing facilities and associated utilities resulting from this increase in population aggravated the competition for labor.

The South Carolina Power Company furnishes electric, gas and transportation service in this area, because of the competition of war industries paying higher wages, women were employed early in 1942 to replace men going into the armed services and in some instances leaving for better paying jobs in war industries. This replacement has progressed to the extent that there are now approximately 100 women employed by the South Carolina Power Company in this area in jobs of the type for which only men were formerly considered suitable.

Expansion of the Company's transportation service, appliance repair, meter reading and other activities have been responsible for additional employment for which women were found suitable. Women are now employed as addressograph operators, stockroom clerks, meter readers, appliance repair-women, single-phase meter testers, draftswomen, service station attendants, garage clerks, production clerks, bus operators, and bus conductors and garage mechanics.

Women employees in jobs requiring aptitude usually receive at least 160 hours vocational training given by the United States Department of Education through its National Defense Training Program. This training program is maintained for the purpose of training women in the skills necessary to replace men in war industry and there is considerable competition for women completing this course. Former beauty parlor operators are usually adept mechanically, and machine operators in a local tobacco factory have proved highly satisfactory.

A thorough physial examination, similar to the examination given men doing the same class of work is required of each woman applicant. There are no rigid height and weight limits but most women employed have been between 5'-3" and 5'-10" in height while weights range from 110 to 150 pounds. Either married or single women are employed, but most women are married, being wives of the men in the armed services, or of men employed in local war industries. Many are impelled to accept employment as a contribution to the nation's war effort.

Considerable readjustment of employees has been made necessary by the present man-power situation. Approximately ten per cent of the total employment of the company have been lost to the organization due to entering the armed services. This number includes a number of technical

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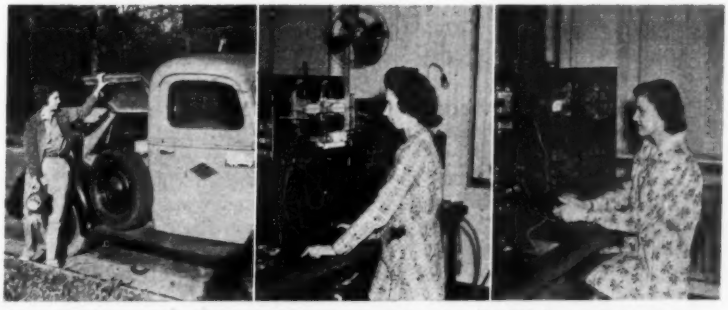


Women are successfully filling men's jobs in the Richmond meter department of Virginia Electric and Power Company. At left, Mrs. E. G. West opens up her service truck as she prepares to serve a customer for whom a meter has been ordered changed. She drives the service truck and cleans, repairs, and paints meters. In the center and at right are Miss A. L. Ware and Mrs. J. B. Richardson, assistant laboratory meter testers and repairwomen, busy at their electrical testing tables. Supervisors report that these women are taking particular interest in their new work and are studying to increase their efficiency.

*Mr. Busby is assistant to the president of South Carolina Power Co., Charleston. This article is adapted from a paper presented before the Engineering and Operations Section, Southeastern Electric Exchange, in Atlanta, March 25 and 26, 1943.

Appliance Sales of the Future May Follow New Patterns

By Roy A. Palmer*

AS THESE lines are being typed, we still have two wars to win—wars which are the greatest in every way that have ever been fought by our country. There are problems of immense magnitude in connection with these wars. Then, after Victory, there will be the enormous problems of peace. The conversion of industry to peacetime status will not be easy with its biggest customer of all times, Uncle Sam, suddenly stopping his buying, the confusion resulting from returning soldiers, shifting of war workers to new locale, reorganizing production, sales and administrative staffs, and hundreds of other things which will engulf the minds, time and energies of executives at that time.

In view of all this, it may seem a bit premature to think about how electric appliances will be sold when that happy day comes. Even though it is too early to plan with any detail at all, we can perhaps be forgiven if we make some observations even from this remote viewpoint. Certainly, if we make an appraisal of what the situation might be as we progress toward that day, we should be in a position to make better plans, better decisions and to effect better results even though we may change our ideas many times during the interim.

To appraise the future, we must study the past. Not that we want to follow the same procedures as we have in the years gone by. To do so might be committing the grossest error, for the changes in the post-war world will no doubt be so great that our former methods and channels will be completely outmoded. But we can survey what has been accomplished by our selling in the past and then determine what the future selling procedures should be, taking into consideration also the effect which the war has had on the development of new materials, new inventions, etc.

During the past fifteen to twenty years, major electrical appliances were sold in conjunction with an educational campaign. For example, when the electric refrigerator came upon the market, the public generally was skeptical. People weren't sure that it was practical. Manufacturers sent trained instructors to hold meetings with salesmen informing them of the engineering features of a refrigerator so that the salesmen could tell prospects in his own words how an electric refrigerator worked.

It was a long, expensive selling job, but when the public realized that the electric way of refrigeration in the home was practical, dependable, and economical, no more engineering schools were necessary for the salesman. When Mrs. Housewife was once convinced of those features, she didn't care about the mechanical side of refrigeration any more than she cares about what's under the hood of her automobile as long as it performs properly. With the acceptance of electric refrigeration, the appliance industry was started on its way toward the greatest crusade in history to free the housewife from household drudgery. It gave impetus to the development and acceptance of other appliances.

Once an electric refrigerator was installed in the home and well on the way toward its final payment, the electric range was considered. Here again, an educational job had to be done. It was an entirely new and different method of cooking; it seemed too slow, the range was higher in price than other cooking ranges before large volume sales lowered the cost, the cost of operation was higher than other forms of fuel. The prevailing methods of cooking depended upon the skill of the housewife, but even with that skill, she had to be shown that electric cooking was practical and that for its higher cost at that time, it possessed features such as controlled heat, automatic control of cooking time, cleanliness, and many other advantages which were worth that extra cost.

In the same manner, electric water heating has had to go through a pioneering stage to create an acceptance. Low electric rates and proper installations have helped to speed the volume sales of water heaters.

Washing machines were not popular with the southern housewife largely because low cost servants had long taken care of the laundry problem in the home. Favorable rates of commercial laundries further urged the housewife to keep washday away from home. The advent of the automatic home laundry began to change the picture. The servant problem, plus a realization that the home laundry can do many things in occasional washings for the family and household which mean economy and convenience, had begun to make an appreciable showing in sales of this appliance just before the war.

Thousands of attic fans are in use in the South and their owners are enthusiastic about them. The cool nights which are prevalent through such a great part of the South throughout the summer make

*Mr. Palmer is merchandising and advertising manager for Duke Power Company, Charlotte, N. C.

the attic fan an indispensable appliance for the comfort of every member of the family. Similarly, stokers and oil burners are in use in thousands of homes. But the market includes hundreds of thousands of homes.

The dishwasher had probably not reached the stage of acceptance that it deserved before the war began. The garbage disposal unit also was in the same category. The main reason for this in the case of both appliances was their relatively high cost. They have proven their practicability and if the war had not stopped them, they would have shown progress in acceptance as history has shown in the case of other appliances.

From this review, we can see how each appliance had to make its way on its own merit. Each one was sold as a separate unit. We built houses which were nothing more than a shell and, with the exception of te furnace and plumbing, all of the convenience and drudgery-relieving things such as electric appliances had to be purchased afterward and installed one by one.

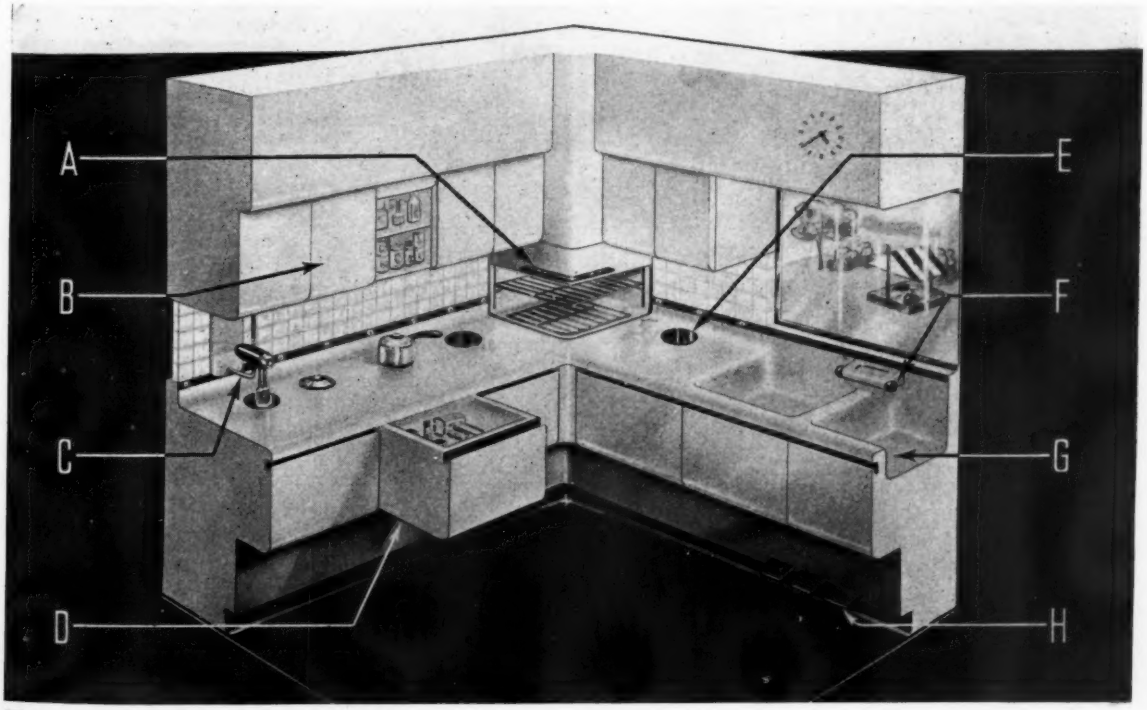
Today, we have an acceptance of virtually all of these appliances and when the war is over, it is reasonable to expect that the home owner will want every one of them. He won't have to be sold on their practicability, dependability, and economy. He already knows of their performance. He realizes that the servant problem after the war will not be easier; it will in all probability be worse. The home of tomorrow then must have these appliances which will minimize the task of housekeeping and conserve the time, strength, and energy of the housewife.

Under these circumstances, the distribution and selling of appliances may be quite different than before the war. Instead of selling one appliance at a time, a group of them can be sold. Actually, the range, dishwasher, garbage disposal unit, attic fan, home laundry and stoker are all units that should be built in as a part of the house. The only reason they haven't been installed in the home in the past as it was being built was because we were selling each one as individual units and because we had to build an acceptance for each one as we sold it.

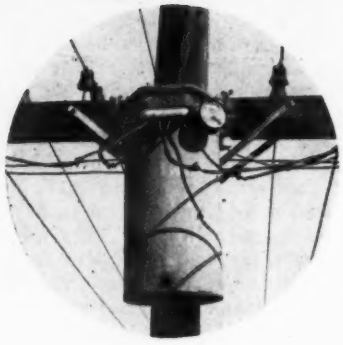
Is there any reason why a builder should not purchase these appliances and build them in as he constructs the house? They would become very definite sales assets to the house. Their financing would become a part of the house financing. By purchasing in volume, the builder can price his house reasonably in view of all of its desirable features as afforded by these appliances. So many of the prospects for new homes will be in the market for new appliances that the possession of some of them in their old home will not be a handicap to the builder in affecting a sale. To newlyweds buying new homes the idea of purchasing the appliances which they want and need under a blanket purchase of the house will have

(*Please turn to page 75*)

The electrical industry has been told that it is not to expect radical designs and improvements in electrical equipment the moment the war is won. But, as Mr. Palmer suggests in the accompanying article, there are certain changes that have been in the making for several years and these have been merely delayd by the war. Perhaps the most important change that will take place is the eventual development of unit kitchens rather than unit appliances. An industrial designer's concept of such a kitchen is shown below. So realistic is his sketch that we hasten to add that this is not a photograph of actual equipment or even a sketch of equipment that is to be manufactured—it is an industrial designer's dream of the kitchen of tomorrow. Some of the features he anticipates are marked by letters: (A) built in broiler; (B) molded plastic cabinets; (C) food mixer; (D) pull-out refrigerator drawers; (E) cooking units at logical points of use; (F, G, and H) water outlet, sinks, and faucet foot control.



(Photo courtesy Durez Plastics & Chemicals, Inc.)



Loading Distribution Transformers by Test

By J. D. Malone, Jr.*

UNDER NORMAL conditions one of the primary objectives of every operating engineer is to obtain the maximum efficiency from all equipment and materials. This objective becomes even more important under the present abnormal conditions whereby it is almost impossible to obtain new materials and equipment. In the face of this problem, the operating engineer must utilize every trick possible and exercise all the ingenuity at his command to work the existing materials and equipment to their utmost capacity. To the operating distribution engineer this means a careful analysis of the distribution system to determine how and where steps may be taken to attain this objective. The answer to the "where" becomes obvious inasmuch as transformers form such a large part, both financially and as an item for good, or otherwise, of the distribution system. The answer to the "how" is equally obvious, i.e., fit the transformer to the load.

Numerous articles are available on the subject of loading, testing and fusing of transformers with the majority of them dealing with the problem in a theoretical or technical manner. Such articles also frequently have a tendency to emphasize the larger transformer installations, often more or less overlooking the number and importance of the small distribution transformers.

This discussion will deal more with the practical aspects of the subject, particularly the experiences and practices of a southern utility company. The distribution by this utility is at 2300/4000 volts, with the exception of a minor amount of 13,200 volt distribution in outlying sections. This paper will be confined primarily to the discussion of loading, testing and fusing of pole mounted distribution transformers of 50 kva and smaller, 2300/4000 volt class, inasmuch as knowledge of loading conditions on large installations is obtained from customer demand meters.

The intelligent loading of such transformers must necessarily be preceded by the obtaining of existing load data, either empirically or by means of actual load tests. For a number of years, it has been the practice of this utility to use the latter method, all single-phase pole mounted transformers being tested each year during the peak load months of November and December, and all pole mounted three phase banks every two years during the months of July and August when the ambient temperature is highest.

These tests are made with a thermal indicator known as a Thermotel. This device consists of a liquid filled tube, the lower end of which terminates in a closed bulb, and the upper end of which is affixed to a head containing the operating mechanism and a dial across the face of which moves a driven hand and a maximum reading friction hand. This dial has a scale range from 25% to 125%, the calibration of the

●

Test data is recorded on this form for further study by the engineering department.

*Mr. Malone is assistant operating engineer for New Orleans Public Service, Inc. This article is adapted from a paper presented before the Engineering and Operations Section, Southeastern Electric Exchange, in Atlanta, March 25 and 26, 1943.

SHEET No._____ TRANSFORMER LOAD TESTS FEEDER No._____ DATE_____

Form 742–0848 8-31. 10 books 100 leaves to book

	TRANSFORMER		OIL		FUSES		LOCATION						INSTRUMENT			
No.	Co. No.	K.V.A.	LOW	BAD	TYPE	CONDITION	HOUSE No.	STREET	POLE No.	U.	L.	FROM	No.	TYPE W.H.	TYPE G.E.	READING
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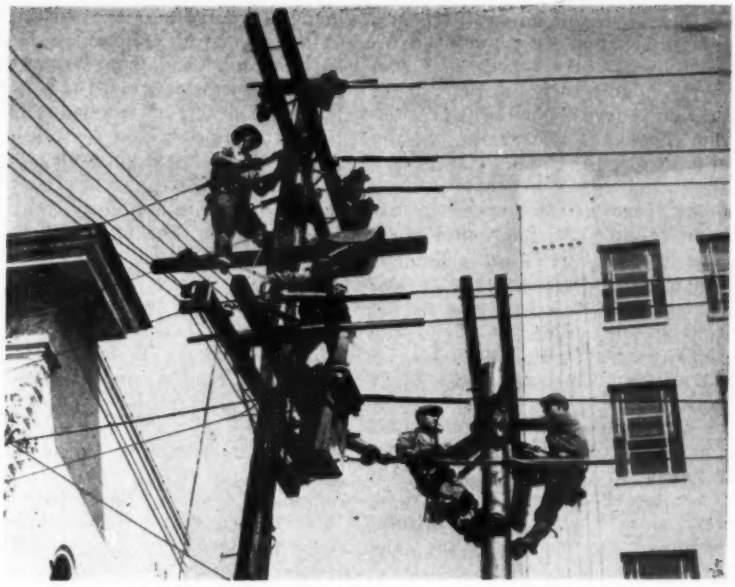
REMARKS:

Test data is recorded on this form for further study by the engineering department.

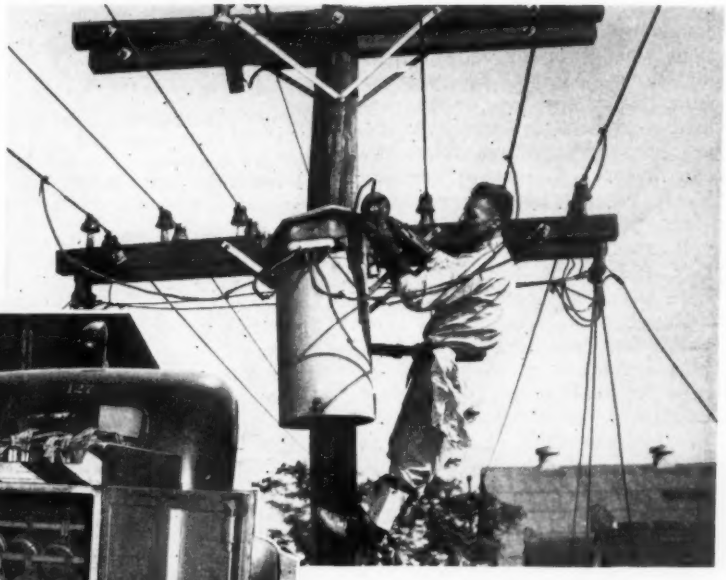
instrument being in terms of thermal load, based on the assumption that 100% thermal load is the steady load necessary to give a 90° C average winding temperature. This instrument is installed by merely lifting the transformer cover, inserting the tube into the oil, and replacing the cover.

In making the tests with these instruments, each of two-man crews is given a print of a 2300 4000 volt circuit, a light truck, and approxximately 150 Thermotels. Starting from a given point, the crew follows the circuit, placing one Thermotel in each single-phase lighting transformer when testing single-phase transformers, and one Thermotel in two of the three transformers forming a three-phase bank, when such installations are being tested.

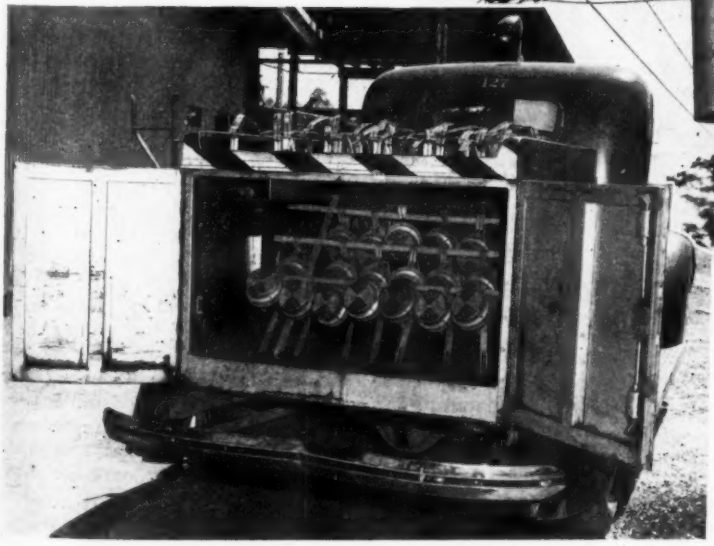
When all Thermotels have been installed, this usually taking about four days, the crew returns to the starting point and begins removing the Thermotels, recording the maximum readings as shown by the friction hand on a form provided for that purpose. This removing and recording is done in the morning, the afternoon being spent in re-installing these Thermotels in other transformers. In this way from four to six days have elapsed between installation and reading of the instrument, thus assuring a representative picture of the load carried by the transformer.



While installing and removing the Thermotel, a visual inspection of the installation is made by the man on the pole, this inspection covering condition of bushings, cut-outs, leads, tank, oil level, and color of oil. This information is placed on the same form containing the Thermotel reading. As a result of this inspection, numerous cases of incipient trouble are discovered, and repairs and corrections made before a major fault develops.



Upper right, a repair crew is working on a three-phase transformer installation. At right is lineman installing a Thermotel in single-phase transformer. Below, truck used by Thermotel crew.



At the end of each day, the forms are sent to the office where the data is analyzed. Being a thermal instrument and operating

on the basis of oil temperature, this instrument does not read directly in kva or amperes, nor have we been able to construct a calibration curve showing the relation between Thermotel reading and kva load which will fit all sizes and types of transformers being tested. However, it has been found that Thermotel readings of 70%, 100%, and 110% on the average lighting transformer corresponds to a kva load of approximately 100%, 135% and 150% respectively, lasting for the duration of the night peak, which is about two hours. When used on three-phase installations where the load is more or less steady for a period of eight hours or so, the Theromotel reading is used as read since Thermotel reading and kva load are practically the same under these conditions.

Allowable Maximum Loads

With these values in mind the next question is what shall be the maximum allowable load on the transformer? There is no hard and fast answer to that question because items other than temperature enter into the problem. Load cycle, nature of load, and, to a large degree, regulation must be considered. Under present conditions when so many voltage regulators are operating in the maximum boost position under peak load conditions and improvements are curtailed, voltage regulation can become a serious problem. Even though the regulation is within the limits of 105 to 125 volts specified by the War Production Board, the loss in revenue with the lower voltage must not be overlooked. Taking all these points into consideration, we have, in general, set the maximum permissible load on the transformers at 110% Thermotel load or approximately 150% kva load for lighting transformers, and 110% Thermotel load or approximately 110% kva load for three-phase installations.

With this limit in mind, we recheck all transformers having a Thermotel reading of 110% or over to insure the accuracy of the reading. In the event this second reading differs from the first by as much as 15%, a further check is made with a maximum reading ammeter. As a result of the analysis of the Thermotel readings and other factors due to local conditions, the underloaded and overloaded transformers are shifted to obtain the most efficient balance between load and transformer capacity. By doing this, the loss of transformers from overloads, and the resulting purchase for replacements, is kept at a minimum.

While the foregoing applies primarily to single-phase lighting transformers, the treatment of three-phase banks is practically the same. Since Thermotels are placed in only two of the three transformers making up the bank, a further check is made with a maximum reading ammeter if the readings of these Thermotels differ by 15% or more. A motor load being less critical of voltage conditions than a lighting load, less emphasis is placed on voltage regulation as a factor in determining whether or not to change out the transformers.

On completion of the analysis of the tests and corrective measures, if any, the readings are posted on a history card of the transformer, and become a permanent record of the loading on that transformer.

The following figures give the results obtained on single-phase pole mounted transformers for 1942 by this method of testing and loading. (Three-phase installations were not tested this year.)

Transformers	Number	Per Cent
Tested	2009	100.0
Re-tested	116	5.7
Changed a/c Overload	93	4.6
Changed a/c Underload	67	3.3
Requiring Painting	135	6.7
Requiring Additional Oil	136	6.7
Requiring Other Attention	37	1.8
Burned Out a/c Overload	13	0.65

The cost per test, which includes original and susequent tests, amounted to $0.56; this figure includes field labor and truck charges, but excludes overhead and office labor.

A discussion of the loading of distribution transformers is hardly complete without bringing the problem of fusing of transformers into the discussion, so closely are these two subjects associated. The method of fusing such transformers falls essentially into two classes, i.e., fusing for transformer protection, and fusing for circuit protection.

The latter method is used by this utility, the reason being more apparent after a brief description of the distribution system.

Briefly, this distribution system consists of the conventional 2300/4000 volt, radial primary with neutral common to both primary and secondary. No sectionalizing fuses are used in the primary. Transformers are connected to the primary through fused cutouts and are tied solidly to the secondary which consists of No. 6 or No. 2 TBWP wire. No secondary fuses are used, transformers are not banked, secondaries are isolated. Thus any fault on the secondary system, or in the transformer, must be cleared by the primary fuse.

Trees Source of Trouble

The trees of this city are a source of pride to the citizens but, to the utility, are a source of trouble. Burning down of primaries by the trees can be held to a low figure by the use of tree wire but the expense of this type of wire for secondaries is not justified. Consequently, during wind storms, secondary shorts, caused by conductors being momentarily forced together by tree limbs, are numerous.

With such a type of distribution system and such tree conditions, together with a location having one of the highest number of lighting storms in the country, the use of lower rating fuse links generally applied when fusing for transformer protection would result in an extremely large number of fuse outages, with the resulting loss in revenue and good will. In addition, the locating of secondary shorts which cause blown fuses would be extremely difficult.

Therefore, the utility prefers to fuse for circuit protection, even at the risk of possibly shortening the life of transformers somewhat, by fusing all distribution transformers, 50 kva and under, with 40-ampere links. By the use of this link rating, the transformer is made to carry the fault current of a secondary short until either the fault clears, the secondary is burned down, or the transformer fails. Should the secondary burn down, only those customers beyond the break are affected, and the service man dispatched to the scene can readily locate the break and make the necessary repairs.

(*Continued on page 66*)

Wartime Economics for Transmission and Distribution

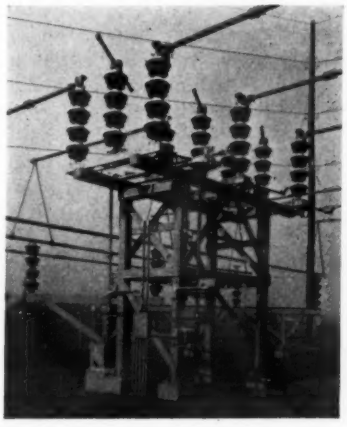
By L. Bartlett*

THE SCOPE of transmission and distribution is too broad and complex to be covered even in outline form in any one discussion. The few ideas expressed below are rather by way of illustration of the kind of opportunities we sometimess have of getting increased capability at relatively low cost. They are not new and are only suggested because I feel we should use ideas of this kind more frequently . Some are of interest from the standpoint of immediate economy, others more from the standpoint of providing capacity for future growth, such as raising of distribution voltage, and all are entirely consistent with war economy and conservation of materials.

Transmission

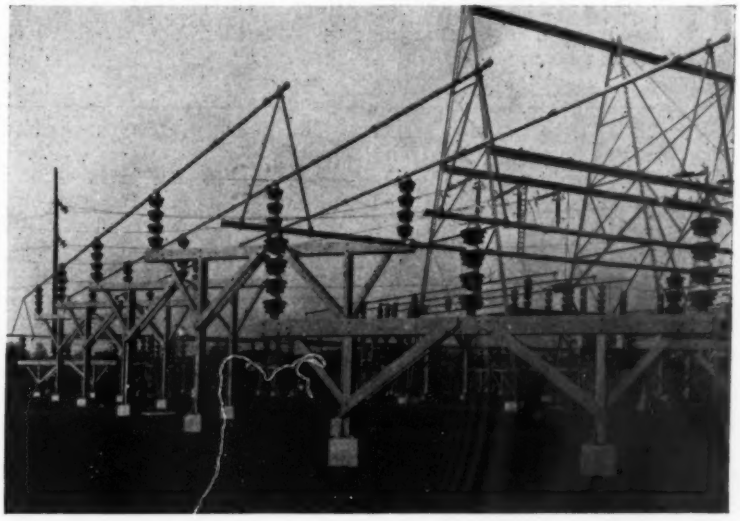
Now that treated poles with fairly long life are available and the high impulse value of wood has been proven, the cost of steel can be justified only in special cases, such as heavy transmission capacity, requiring two or more circuits over expensive right of way. Conventional double circuit steel towers are unsatisfactory in ice and snow country because of snow unloading and galloping during ice storms. If steel lines are designed for the same impulse as can be cheaply obtained with wood, they require insulator strings almost twice as long and become excessive in cost. For double circuit high voltage lines over average country, two wood H frames are often the best economic answer and particularly so if the second circuit is to be added at some future time. There are thousands of miles of double circuit steel towers on which space for second circuit has been idle for ten to twenty yeas. A reasonable life expectancy for wood is now 25 to 30 years, and although that for steel is much longer, the increasing danger of obsolescence forbids crediting steel with life much longer than wood. The change in practice from steel to wood has made an outstanding improvement in both economics and reliability.

Setting up high construction standards such as H frame and suspension insulation for about 69 kv and above is commendable providing we do not let it lead us into building good lines in those cases where only cheaper construction is justified. Probably all of us have sometimes been guilty of that mistake. We should always be willing to consider all kinds of conductor, poles and other materials and tailor our engineering and expenditures to the service and revenue values we may properly expect over a reasonable period of time.



Wood frames are used for this 132 kv high switch rack. With the exception of steel ground rods, plates and bolts, the switch racks are built entirely of pressure-treated lumber.

An illustration may bring out more clearly what I am trying to emphasize. We are sometimes required to build a line to a single industry and there may be no justification for expecting this line to become an important element in our system as a whole. The difference in cost between the best standard construction and a single pole ridge pin design without static wire may be two or three to one. The permanency of a single industry in a particular location is always uncertain and there are no exceptions. Only to the extent that the cus-



Treated wood beams used in connection with steel columns in a 26 kv outdoor substation. Wood has been painted grey to match galvanized steel.

*Mr. Bartlett is associated with the Electric Advisers, Inc., New York City, N. Y. This article is adapted from a paper presented before the Engineering and Operations Section, Southeastern Electric Exchange, in Atlanta, March 25 and 26.

tomer guarantees us against loss is good construction justified. While this is a policy rather than a technical problem, our duty as engineers and operators is to assist management in keeping each important element of our business insofar as possible on its own economic feet. Generally, we fulfill this obligation, but we are the ones to say how and to what extent the investment can be reduced, and sometimes in our natural desire to build well, we overstep the mark.

Trend Toward Higher Voltages

There are many lines operating at voltages in the 13.8 kv—46 kv range which would, if the system were being built today, be at the next standard voltage higher. This is particularly true where the higher voltage would result in a more economical voltage set-up for the system as a whole, namely, the right number of voltages with logical voltage ratios, generally between limits of 3 to 1 and 5 to 1.

When transformer connections are delta-delta and line insulation is sufficient or can be made so at moderate expense, voltages in this range have sometimes been raised by connecting transformers in star. This gives non-standard voltages of 40, 60, and 80 kv, but this should not be objectionable as a temporary war expedient for a particular line or part of a system. As a permanent change, however, a better plan is to star the transformers and tap the windings back to 34.5, 46 or 69 kv, as the case may be, connecting the tapped point next to the grounded neutral. This arrangement gives standard voltage, some times eliminates necessity of raising lightning arrester protective level and increasing line insulation and is overall a more conservative and economical solution. The effective transformer capacity lost is about one half of the capacity of the dropped out winding. The increase in line capacity is in ratio 4 to 9 or 9 to 16 depending upon the particular voltage in question. Initial voltage of 13.8 kv would, of course, star to full standard 24 kv and then we have capacity increase of 1 to 3. Change out of steel to wood braces is often a possibility which helps to avoid change out of line insulators and increases the supply of steel scrap.

Probably the greatest single deterrent to more of this practice is the fear of using present transformers at the higher line voltage. We cannot expect manufacturers' transformer engineers to recommend it as they must take a cautious and conservative position, but that does not mean that they consider it bad practice. Important points to keep in mind are:

If transformers are single phase, salvage one half of high voltage bushings.

Reduce substation ground resistance, if possible.

Do not raise lightning arrester level any higher than absolutely necessary. Try out present arresters if there is a possibility that they will be satisfactory.

Locate arresters as close to transformers as possible.

Clean out transformers, keep oil in good condition and avoid unusually high temperatures during the lightning season.

If the transformers are quite old these precautions are highly desirable.

One case recently completed and now in operation covered 78 miles of 23 kv line raised to 34.5 kv, eight substations, eighteen transformers single phase, three transformers three phase, transformer size 150 kva to 1200 kva, total capacity 9450 kva. Many of the transformers are quite old, some more than 25 years. Line insulators were 35 kv, nominal rating, and no work was done on the line. The total cost was $13,000 which is $1.40 per kva. Line capacity was a little more than doubled. Many times this cost could have been justified had it been necessary.

In general, this method of raising voltage has not been widely used. It often offers an excellent opportunity to get an increase in capability at low cost, and we should try it out oftener, so that we may soon learn how far we can go with satisfactory results.

Other obstacles which limit our possibilities of making this change at low cost are inadequate voltage ratings of circuit breakers and other substation equipment, also the problem of phase displacement in loop circuits.

On large systems which have several or more areas, without wire connection at the voltage to be raised, a good plan may be to raise voltage in one area, changing out inadequate equipment and absorbing it into other parts of the system. Regardless of change in voltage, when new breakers are purchased, they are often rated for higher voltage in order to get adequate duty ratings. This is more often true at the lower voltages such as 23 kv, where we find many breakers in service rated at 37 kv.

Another problem is where transformers are star connected on low voltage side. Where we have a static wire, will it prove satisfactory to connect star-star, tying the static wire and the distribution neutral together at all available points? Although this possibility has been discussed, it has not to my knowledge been sufficiently explored by which I mean tried out in practice, and I do not believe we yet know the answer. This corresponds in basic principle to star-star four wire primary and secondary common neutral which has proven satisfactory. At the higher voltages in question the answer may not be the same. I suggest that if we have not done so, we try it out on a small scale when we have a favorable opportunity, as a proven satisfactory result would greatly improve our possibilities.

It is generally recognized that the two principal dangers from single phase transformers connected star-star without delta tertiary are excessive third-harmonic potential stresses and possible inductive interference to communication systems from third-harmonic ground currents.

It is also generally accepted that these dangers are much less if generator neutrals are grounded and connected through to transformer neutrals and if there are other transformers on the system connected star-delta.

The problem is so complex and the cases which arise so different that we cannot foretell the answer for any particular case without actual trial.

Substations

The remarks made under this heading apply primarily to distribution substations rather than to large step-up stations.

The increasing trend to unit substations is good economics. This trend in general will mean somewhat smaller stations located nearer the load, and three phase transformers with voltage regulation built in.

In areas with light to moderate load density, we will have single unit stations supplying from one up to possibly four feeders. Most of these units will be between the limits of 1000 and 5000 kva. The circuit breakers will generally be part of the unit and the number required will often be less than the feeder mains leaving the substations, two feeders being controlled as one, with disconnects, repeater fuses, etc., in each set of mains. In heavier load areas, there will be two or more units at the same location.

The cost will be considerably less less than that for non-unit type and the amount of equipment and materials very much less. Substations structures will be almost eliminated, space requirements less, engineering and labor problems simplifid and maintenance reduced. We will have less difficulty with adjacent property owners and more selection as to location. I realize this sounds like a manufacturer's advertisement, but I am sure that our future economy will be greatly improved.

For emergency we will depend almost entirely on portables and feeder ties to adjacent substations and in emergency resort to heavier peak loading with forced air and oil circulation.

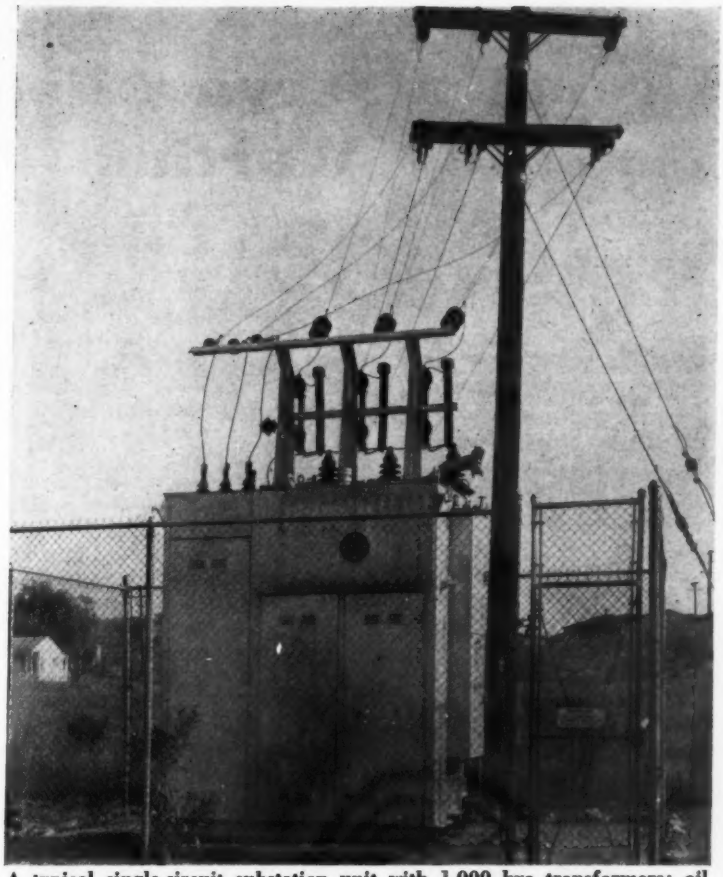
To get the most economy from this change in practice, I suggest the following:

Where soil conditions are favorable do not put in concrete. Locate on rails and timbers set in crushed stone or gravel. In spite of all our planning, we do abandon substation locations.

Locate portables on platforms or cribbing or at crane location, leaving trailer available for general use.

As load density increases, go to greater average load per feeder, not necessarily as regards feeder mains, as substations located closer together work against this, but as regards feeder circuit breakers and other control accessories. As the art of distribution improves, we should force ourselves to overcome our fears of heavier load served from one feeder control. It appears that most companies will soon be down to a maintenance basis. This will give more opportunity to get overhead lines into more reliable condition.

As you develop this unit substation practice, get to reasonably large units as fast as consistent with other problems, resorting to change out rather than purchase of too many small units. With this kind of construction, change out is relatively easy and keeping more to larger single unit stations will keep the cost per kva lower.



A typical single-circuit substation unit with 1,000 kva transformers; oil circuit breaker; and three pellet lightning arresters.

Do not specify regulation range of the units for the usual 10% plus and minus range unless it will be needed. It is unlikely in the average case of several feeders reconciled to master regulation that so wide a range can be utilized. Also, the usual regulation steps of five-eights per cent which have been customary are closer than necessary. Reduction in range and number of steps will reduce cost. We are gradually raising feeder power factor which together with somewhat shorter average length will reduce the required range. Also where conductor size is such as to make resistance factor relatively high, conductor size can be increased after the war, which will also reduce range requirements and reduce losses. It is my observation that many companies have considerble regulation range unused and particularly so in the buck direction. This unused range and excess number of steps involves an investment penalty. If we weigh more carefully our future purchases, we can improve our results in this regard.

When building substations of the more conventional type, wood framework should be used more frequently during and after the war. In many cases, and for various reasons, wood is not feasible, but where conditions are suitable, it is somewhat cheaper, and the wood insulation has some value. In some cases, it would facilitate a later increase in voltage with less increase in insulation.

Unit substations, three-phase transformers, group feeder regulation, greater loads per feeder

(Continued on page 74)

Customer Service Emphasized in Utility Wartime Program

By R. B. Roberts*

THE FIRST objective of our wartime program was to coordinate all our efforts with those of our government. Our general objectives were to maintain customer appreciation of our service, to assist customers through home interviews, group demonstrations, lectures, training meetings and advertising to participate in Victory Program activities; and to show customers how to realize greater savings by conserving health, materials, time and money through full economical use of their present electrical equipment.

In the accomplishment of our objectives, we planned to systematically interview 100,000 residential and farm users of major equipment, and to retain present revenues; to show customers the economical use and proper care of their equipment, demonstrating the relatively low cost of its use and how to make minor adjustments to equipment; to settle all complaints and clear up misunderstandings or erroneous beliefs regarding our company or the electric utility industry; to develop an understanding and appreciation of our company, the electric utility industry, and American business; and to assist all sales allies to remain economically strong during the war and post-war periods.

Home service representatives worked in assigned territories, under the supervision of residential supervisors and were responsible for specific objectives in conducting planned home interviews, mass lectures and demonstrations and other activities.

Advertising and promotional material designed specifically to supplement our home service activities included newspaper and radio advertising, newspaper publicity, window and floor displays, bill inserts, "At Your Service" booklet, "Health for Victory" club materials, "Dealer Sales Developers", Adequate Wiring presentation charts, wartime service dealer window transfers and pledges, wartime service files for dealers, educational materials concerning nutrition and related subjects, small appliance repair kits, and "Dealer Developer Kits.'

Our company has been actively engaged in dealer development activities for the past eleven years and as a result, company appliance merchandising and repair activities have been discontinued for some time.

Our 1942 customer service program originally included three groups of residential members: home service representatives, cus-

*Mr. Roberts is general sales manager for Florida Power & Light Co., Miami, Fla.

WE ARE GLAD TO KNOW HOW TO CHANGE FUSES!
IT SAVES US A LOT OF TIME AND INCONVENIENCE BECAUSE —
Here's How We Prevent Fuses from burning out:
1 We avoid connecting too many appliances or extra lamps on one circuit.
2 We are careful not to overload our washer or feed too many bulky materials through the washer wringer or ironer at one time.
3 We take good care of our cords so they will not become frayed, cracked, broken, strained or kinked.
4 We never let our cords come in contact with water, grease or acids — we always disconnect our appliance by pulling on the plug — never the cord.
5 We take good care of our sockets and plugs and see that the plugs fit tightly into the appliance sockets or outlets.
6 We never use faulty appliances, we have them repaired by an electric appliance repair dealer.
★ ★ ★ ★ ★
Here's How We Change Fuses when Necessary:
1 If our electric service goes off and our neighbor's service is still on we know that the trouble is in our own house.
2 We keep plenty of the correct size and type fuses on hand and know where our fuse box is located.
3 The first thing we do is to disconnect all portable appliances and then pull the large main switch to "OFF" position (while standing on dry surface).
4 We discover which fuses are burned out by looking through the glass-like top of fuse to see if the tiny wire inside is broken.
5 When the burned out fuse is discovered it is removed by turning to left and new one is inserted by turning to right as tightly as possible (touching only top of fuse).
6 The large main switch is then pushed back to "ON" position —if the fuse burns out again, we call an electrician.
CAUTION
FLORIDA POWER & LIGHT COMPANY
BUY WAR SAVINGS BONDS TODAY!

Floor display and advertising used by Florida Power and Light Co. in their educational campaign.

KNOW HOW to Change Fuses
Here's HOW TO PREVENT BLOWN FUSES
AVOID OVERLOADING A CIRCUIT
AVOID OVERLOADING YOUR APPLIANCES
NEVER PULL OR "JERK" CORDS
TIGHTEN ALL LOOSE CONNECTIONS
HAVE FRAYED CORDS OR BROKEN PLUGS REPAIRED
WARNING
NEVER USE COIN OR OTHER METAL OBJECT IN PLACE OF FUSE
Here's HOW TO CHANGE BLOWN FUSES
STAND ON DRY SURFACE PULL MAIN SWITCH OFF
DISCONNECT ALL PORTABLE APPLIANCES AND CORDS
REPLACE BLOWN FUSE TOUCH TOP ONLY
STAND ON DRY SURFACE PUSH MAIN SWITCH ON
IF FUSE BLOWS OUT AGAIN CALL YOUR ELECTRICIAN
BLOWN FUSE
GOOD FUSE

tomer service representatives, and dealer sales development representatives. Each group was assigned definite responsibilities and duties tying in and in some cases nearly overlapping those of the other groups. Consequently, after the program was announced, the responsibilities and duties of all three groups were combined. This was done because of depleted personnel and because the successful execution of our entire customer and dealer program now depended to a great extent upon Home Service activities. Therefore, 20 members of our residential group, including seven home economists, were assigned both home service and dealer development responsibilities.

Incidentally, this assignment made it necessary that each home service representative cover from one to five districts of our company.

The three principal activities of our 1942 Home Service Program were home interviews, group meetings, and dealer development.

Home Interviews

Eighteen thousand, two hundred customer interviews were made. Through these interviews, customers were shown the value and cheapness of continued use of our service, shown how to efficiently use and properly care for their equipment, shown how to buy, store and prepare food for nutritious meals, given suggestions regarding substitute foods and materials, given information on rationing and price control, shown how to change fuses and prevent burnouts, shown how and where to get electric equipment repaired, shown how to buy, sell and trade used electrical equipment, shown how to comply with wartime dim-out regulations, presented with facts about our company's present operation, solicited for opinions and suggestions regarding service, and solicited for information to be used in preparing post-war plans.

During these interviews, customers' electrical equipment was inspected and minor repairs and adjustments made by home service representatives. In cases where major repairs were needed, an "Appliance Repair Request" was prepared and assigned to an appliance repair dealer. Customers were encouraged to take advantage of our "Central Service

(*Please turn to page 72*)

Maintenance of electrical appliances is recognized as a most important wartime objective. These floor and window displays indicate the manner in which Florida Power & Light Co. has directed attention to this subject.

Conservation of Equipment Occupies This Sales Staff

By Edgar Chesnutt

SOMETIMES it takes a sudden shock to bring full realization of a situation. War brought such a sudden shock to the Sales Department of the Arkansas Power & Light Company.

The result has been that plans and policies have been changed to such an extent that probably the greatest service this company has ever given its customers and dealer allies is now being rendered, according to P. C. Tucker, general sales manager.

War and its far-reaching effects forced the sales department to use its entire sales staff for new and strange work—almost that of sales prevention rather than sales promotion.

With manpower continually dwindling, personnel turnover increasing, wages frozen, and numerous other obstacles to be overcome, it was not an easy task. But it has been accomplished, and with amazing results.

In many respects the Arkansas Power and Light Company's sales department was particularly well prepared for the necessary transition because of the frequent training schools that had been held during the pre-war period. So the change-over from peacetime to wartime functions was possible with exceptional speed.

Among the new programs the company is now conducting through its sales department are these:

1—Conservation of commercial equipment and home appliances.

2—Utilization of idle equipment for replacement.

3—Maintenance of living standards through proper nutrition.

4—Maintenance of load through adequate repairs for all types of equipment.

Both the sales force and the home service section of the sales department are working on these programs, which have been coordinated to insure maximum efficiency.

Conservation Of Equipment

At the time the change-over to war-time functions became necessary, the sales force and the home service section was already organized in a campaign which embraced personal calls on customers in all classifications of service.

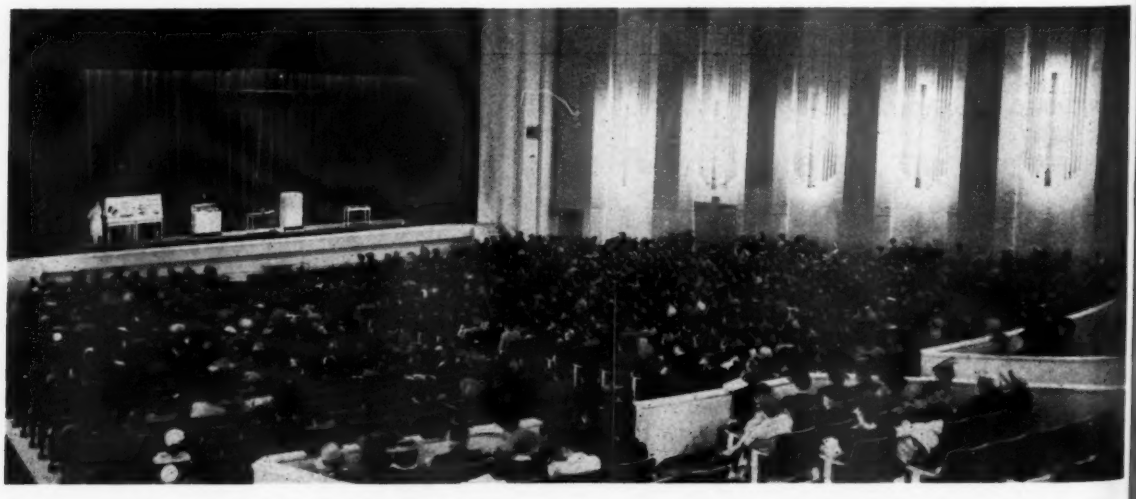
When the conservation program was inaugurated, these personal calls were continued, but a new story was told. In the commercial customer classification, the sales force became customer conservation consultants. All commercial establishments were visited, information was given on proper maintenance of mechanical equipment, and handy card forms left to insure regular maintenance checks. Regular cleaning of lights was urged to improve vision and production in plants. In the home, the home service advisors supplied information on proper maintenance of all appliances.

Daily and weekly reports on these activities disclosed that they were not only appreciated by the customers, but very beneficial to them.

Experience gained in this program disclosed a dire need for maximum utilization of idle equipment. Members of the sales force found many instances where useful equipment was not being used in one establishment, and was needed in some other.

Idle Equipment Utilization

This led to the organization of a systematic inventory of all idle



Cooking schools conducted by the Arkansas Power and Light Co. have been attended by thousands. A typical meeting shown here heard expert information on food conservation, proper nutrition, and war workers lunch kits.

equipment. Each member of the sales force made daily reports on all idle equipment located. Such equipment was reported on convenient forms showing all the necessary data. Weekly lists of all idle equipment were compiled.

These inventories were made available to customers, and in March about 25 items of idle equipment per week were put into use. In many instances, it was found that it could be used in the same town where it had been found. In other instances, it was put to use in some distant city or town. For example, an electric motor of a rare type was desired by a commercial customer. After lengthy inquiry in many states, this customer found just the kind of motor he wanted listed in the idle equipment inventory — located in the building next door! In another case, a small motor desired in a north Arkansas town was found on the inventory, and was obtained in a town 215 miles away!

In this program, the company used utmost care not to engage in any way in the actual transactions involved. It simply made the information available, and the trading was done by the buyer and seller.

Many benefits have been derived from this program. It has kept many mechanical devices in operation in vital war work, and has been of great assistance in preventing a greater decline in load, already severe enough because of priorities and rationing.

Commercial salesmen of Arkansas Power and Light Co. have turned their efforts to instructing customers in proper maintenance of their equipment and to compiling inventories of idle equipment.

Maintenance of Living Standards

The home service section of the sales department has attained splendid results through its nutrition program. This was put into effect after a training school. While individual calls on customers had a part in the plan, mass promotion received major attention. This was done through appearances by the home service advisors before clubs and societies and schools.

Large charts were used to supplement the speaking program adopted. Preparation of menus was the nucleus around which the talks were prepared. In many instances, this program was conducted in cooperation with the home demonstration agents in various counties. In other instances organized Civilian Defense groups cooperated.

Cooking schools proved to be a highly successful medium getting across the story of the importance of proper nutrition. Since Arkansas has a score of large war plants employing hundreds of thousands of workers, much attention was devoted to this subject. Actual demonstrations in preparing the proper foods were conducted, and booklets were distributed at each meeting for permanent reference.

Maintenance of Load

There are many schools of thought on the question of appliance repairs. No system-wide comprehensive policy regarding repairing of appliances has been adopted yet by the sales department of the Arkansas Power & Light Company. Conditions vary so in the 60 counties which the company serves that more experience in this field is desired before such a policy is finally adopted.

In many instances, material shortages, rationing, and the draft have all resulted in the elimination of all sources of repair in small towns. In cases like these, the company cooperates as much as possible in making minor repairs. Where the stiuation involves major repairs, it does not undertake to go into the repair business, but makes available the nearest repair sources and aids in any way possible in getting the appliance to these sources.

A definite policy of encouraging dealers and others interested to increase their repair departments has been adopted. All assistance possible is being given such allies. Assistance in getting repair parts is also offered. In a few instances, it has been possible for the company to assist repair dealers in their manpower problems.

Post War Planning

From the very beginning of its wartime program, the Arkansas

(Please turn to page 71)

Country--Community--Customer Served in "3-C" Program

By Les M. Taylor*

REALIZING THE vital importance of service in wartime to country, community and customer, Mississippi Power & Light Company's sales department has dramatized its 1943 program with the slogan, "C³ in '43" as the theme of a comprehensive plan of action designed to offer maximum assistance to those we serve.

Obviously, our number one objective in 1943 is to make the fullest use of our facilities and personnel in assisting the war effort, at the same time offering every possible means to our customers in helping them solve the many problems arising from the present wartime economy. Thus, through the "C³ in '43" program, we feel that Mississippi Power & Light Company has assumed its full share of responsibility in the real American Way for Country, Community and Customer.

In administering this new program, our sales staff will be available to homemakers, commercial and industrial establishments, and appliance repair dealers. Our residential section will continue to stress, in cooperation with the State Extension Service, the value of good nutrition so that the health and stamina of our people can be maintained. In this connection, our home service staff is at present busily engaged in organizing "Health for Victory Clubs," with more than a score of these organizations already active in our territory. At these meetings our home service advisors emphasize the importance of vitamin-rich foods and the need for protective storage and cookery. In addition, we are promoting the purchase of War Bonds today for modern appliances tomorrow.

Beginning last January, our home service department has published a monthly bulletin, "Victory Hints for the Home", which is mailed as a bill enclosure to some 55,000 Mississippians. Edited by Miss Fannie May Izard, home service director, "Victory Hints for the Home" is a four-page leaflet, 5 3/4" by 8½" in size. Each month this publication offers a wealth of information and ideas on food rationing, practical recipes, care and use of appliances, and other material of use to the homemaker in wartime.

Keeping Appliances Working

Louisiana Power & Light Company, New Orleans Public Service, various manufacturers and distributors, and Mississippi Powers & Light Company conducted an Appliance Repair Training School in New Orleans from February 8th through the 20th. This repair school enabled our six dealer coordinators to avail themselves of specialized training in repairing and renovating appliances and equipment. The purpose of this training was to enable our dealer coordinators to establish repair dealers in the territory and to train dealer service personnel through the company's special dealer coordinator program. Our dealer coordinators will spend approximately seventy-five per cent of their time among dealers in emphasizing the importance of keeping all appliances working for the duration, and in stressing the opportunity which exists for dealers who actively engage in this field.

A series of Dealer Repair Clinics have been planned and dealer coordinators, in cooperation with home service advisors and local managers, will assist all interested dealers in staging these clinics. Our dealers will also be encouraged to maintain and recondition commercial and industrial equipment, with our power consultants helping them to obtain as much of this type business as possible. Company newspaper and radio advertising, as usual, will stress the importance of appliance upkeep through the slogan, "Let Your Dealer Keep 'Em Working For You."

VICTORY HINTS
FOR THE HOME

VOL. 2 No. 4 APRIL, 1943 JACKSON, MISS.

Your Sweet Tooth in Wartime

Shortage or no shortage, America still has a sweet tooth. We know that about all sugar does for us is to give us energy and that we can get that energy from other foods, but "something sweet" still gives us a feeling of satisfaction that nothing else can replace. When your family gets that craving for candy try these wartime sweets. Some call for no rationed products, others call for raisins and a little sugar. All have some food value other than calories and they are delicious. If you cannot afford the sugar and raisins, use the recipe for

FREE BINDER

Would you like to have an attractive binder in which to keep your copies of the Victory Hints Bulletins? If so, we will be glad to send you one free of charge. Just send your written request to Victory Hints for the Home, Mississippi Power & Light Company, Jackson.

Candied Orange Sticks

Candied Orange Sticks
3 oranges 1 teaspoon salt
Water ¼ cup honey

Remove peel from oranges, cut peel in strips. Cover with water to which salt has been added. Boil 20 minutes, drain, cover with fresh water, boil until peel is tender. Drain. Add honey and let simmer very slowly until peel is clear (about 45 minutes). Lay on waxed paper and let stand for 2 or 3 days before using. Fruit strips may be rolled in granulated sugar, coconut, or nuts and used as a confection.

Peanut Butter Raisin Fireballs

1 lb. seedless raisins ½ cup peanut butter
Put raisins through fine food chopper. With your hands, mold or roll out into rectangle about ½" thick. Spread with peanut butter and roll up as you would a jelly roll. Chill thoroughly. To serve, cut crosswise into slices ½" thick. Yield: 5 dozen.

Raisin Nut Honey Chews

1 cup sugar ½ teaspoon salt
½ cup honey 2 cups seedless raisins

Wartime sweets need not be expensive in order to make a hit with your family. Try the recipes in this issue and you'll be pleasantly surprised at the results.

½ cup water ½ cup chopped nuts
1 teaspoon vinegar

Simmer sugar, honey, water, vinegar and salt over low heat to hard ball. Add raisins and nuts and drop by spoonfuls to buttered cookie sheet. Let stand until firm. Yield 2 dozen.

Raisin Honey Rice Flakes Bars

6 tablespoons sugar 1 package (6½ oz.) rice flakes
½ teaspoon salt 1 cup seedless raisins
½ cup water 1 cup nut meats
6 tablespoons honey

Cook sugar, salt and water to very brittle stage (300° F.). Add honey, stirring until blended. Cook again until soft ball (about 1 minute). Pour over rice flakes mixed with raisins and nuts. Pack into square pan (8" x 8"). Chill. Cut into squares. Yield 3 dozen.

Mississippi Power & Light Company's "Victory Hints" bill stuffer.

Wartime Placement Service

To offset conditions brought about by the scarcity of new appliances and equipment, Mississippi Power & Light Company has inaugurated a free Wartime Appliance Placement Service, which offers our customers a practical medium for the purchase, sale and exchange of appliances. Through this service, anyone wishing to buy, sell, or trade an appliance fills out an information blank specifying the item; then turns it in to our local manager. Lists of such items are available to other managers and divisions, and company personnel keeps close contact on commercial and industrial establishments which go out of business so that their equipment can be listed and sold.

In this way, the company acts as a clearing house with the Wartime Placement Service, bringing buyer, seller and trader together—and incidentally creating a new repair market for those of our dealers who specialize in expert reconditioning. As long as the war continues this free placement service will be continued, and re-

*Mr. Taylor is general sales manager for Mississippi Power and Light Co., Jackson.

sults secured thus far indicate that the public fully appreciates our efforts.

Commercial Program

The Commercial Program for 1943 will assist all commercial customers to effectively meet their wartime problems.

A customer survey program started in 1942 will be continued during 1943. The purpose of the survey is to study carefully each customer's use of company's services and to help the customer secure the most efficient and economical use of these services.

"Victory Views for Business" will be issued four times during 1943. This bulletin will contain suggestions to commercial customers and will help them meet the problems confronting all business.

Industrial Program

Our Industrial Program of 1943 is designed to help customers meet the unusual problems brought about by an all-out wartime economy.

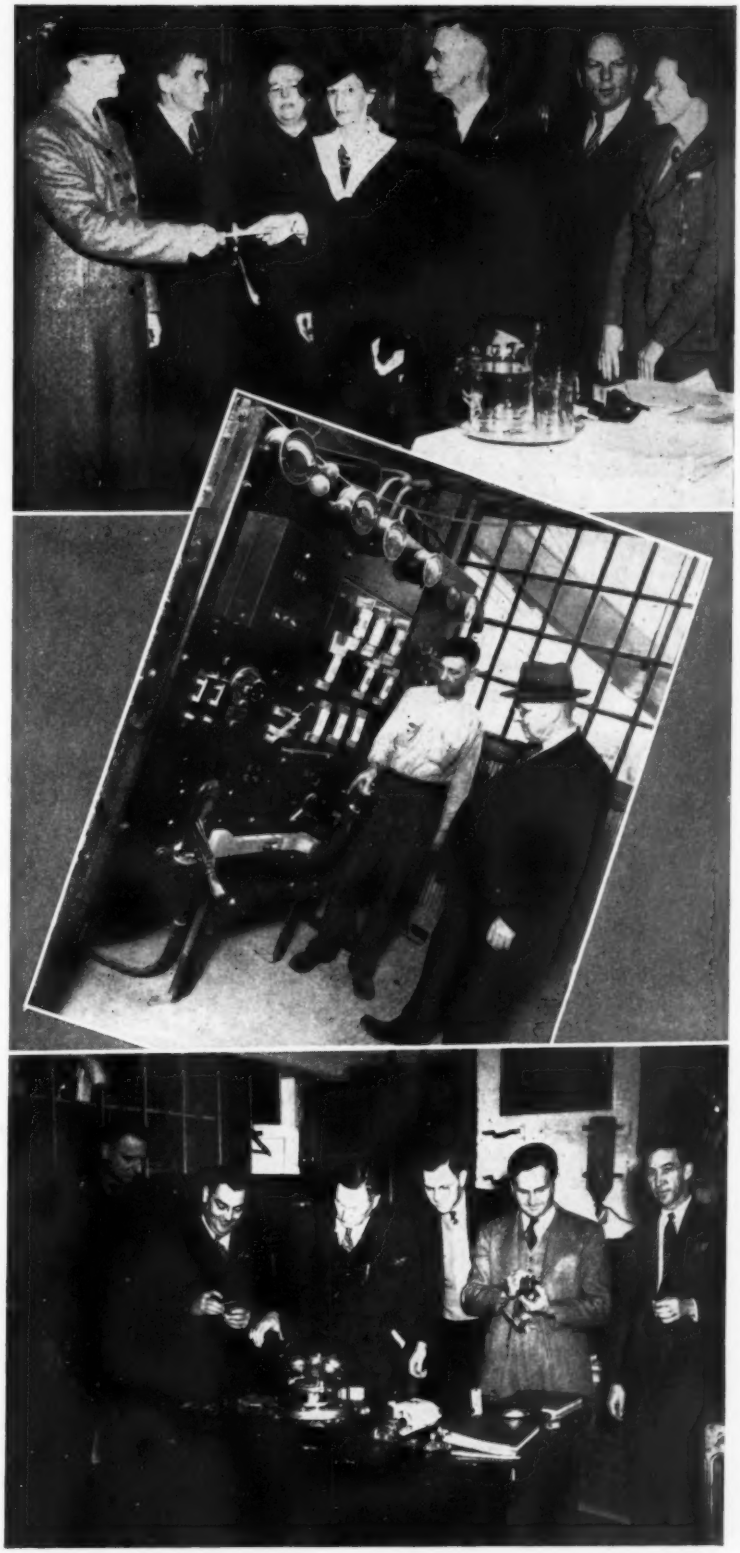
Customer plant surveys to secure increased efficiency of use of the company's services and to speed the production of materials of war, will be of first importance in 1943 in the industrial section. Started in 1942, this program will continue without interruption. Plants engaged in the production of war materials will be closely studied to determine methods of improving output and operating efficiency through efficient use of company's services.

Each power consultant will take every opportunity to further the war effort by helping to get industrial scrap and salvage materials collected and available to the Government for war production, and to use materials conservatively and effectively.

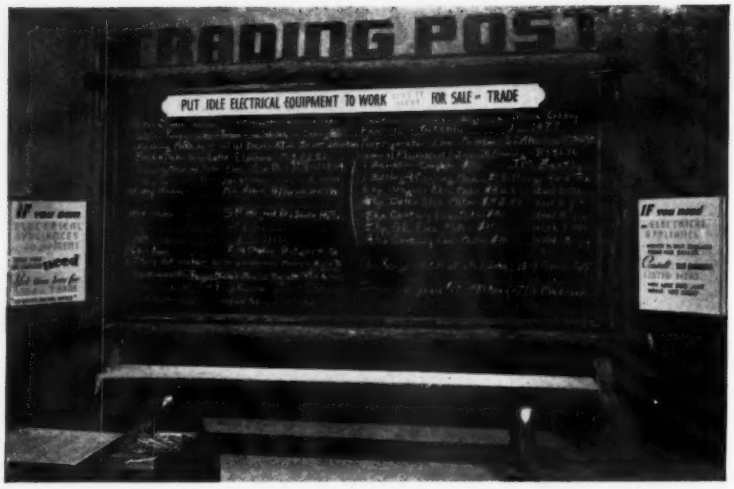
Customers who can handle the production of war materials, who are not now doing so, will be assisted in obtaining war contracts, thus assisting such customers to stay in business and at the same time helping the war program. Full cooperation will be given new industries and projects interested in the company's territory, especially those contributing to the war effort.

The Government and Municipal Program will closely follow the general outlines of the commercial and industrial programs. Every step of each plan designed

(Continued on page 70)



Mississippi's "3-C" program is shown here in action: (Top) Home Service Department has organized scores of "Health for Victory Clubs" among housewives. (Center) Power consultants cooperate with commercial and industrial customers in the interest of conservation and efficiency. (Bottom) Dealer coordinators train dealer personnel in repair work.



Houston Trading Post Keeps Equipment in Use

"WHAT can the utility company put in its showroom to replace the displays of merchandise formerly featured?" is a question frequently asked. Houston Lighting & Power Company, of Houston, Texas, is answering it with many interesting "exhibits", one of the outstanding being its "Trading Post."

The "Trading Post" originated at the Houston Fat Stock Show in February of this year. Being perplexed as to what to exhibit in its space at the stock show, the company finally hit upon the trading post idea, and so successful was it there that it was moved to the showroom.

The Trading Post is a large blackboard, about 7x12 feet in size, framed in pine logs, set a couple of feet off the floor. In front is a bench made from a large pine log, sawed in half, lengthwise, on which the patron can sit to read the inscriptions on the board.

At the stock show, the board was used as a farm trading post. Whatever any farmer or other show visitor wanted to sell, he could list on the board—as long as space permitted — and on it were listed farms, horses, cows, plows and many types of farm equipment.

When the idea went over so well at the stock show, the company realized that here was something for its showroom, worth a trial anyway—and from the day it was set up in the showroom, there has scarcely been space enough to accommodate all the listings desired by the company's patrons and visitors.

Now, however, instead of showing farm equipment, listings are limited to electrical appliances; that is, any equipment which to a greater or lesser degree uses electricity. On it now one will find motors, washing machines, ironers, ranges, brooders, milk coolers, etc. And listing isn't limited to articles for sale; if a person is in the market for some electrical appliances, he gets a listing under the "wanted"section.

Complete record of each item listed is kept in a loose-leaf book designed especially for the purpose. It is known as the "Trading Post Catalog" and contains name and address of owner of an item with description of it, or name of the person who wishes to buy something. For quick reference, merchandise is grouped by commodities. For example, washing machines go on a page, ironers on another, and so on.

The company does not handle any transactions of trading post "customers", merely giving the inquirer name and address of person or persons he wishes to contact. Naturally, the company is in no wise responsible for any merchandise listed. Patrons are requested to notify the office immediately when an item is sold or a purchase made, so that listing can be discontinued. Listings remain on the board a week or longer according to demand for space. But the book provides a permanent record and long after an item has been removed from the board, a prospect may be found for it if it hasn't been sold.

100,000 Contacts Made By Home Service Staff

By Roy H. Knox*

The home service program of the Birmingham Electric Company has been converted to a wartime activity of all-out service to its customers and to the nation. Objectives of this program are: to cooperate fully with the government and other agencies in activities promoting the war effort; to improve health on the home front; to aid customers in meeting homemaking problems arising from the war; to instruct customers in the use, care, and repair of household electric appliances; to promote proper use of lighting for protection of eyesight; to aid customers in enjoying maximum benefits in their use of electric service; to keep alive and advance

*Mr. Knox is sales promotion and advertising manager for Birmingham Electric Co.

Birmingham home service staff symbolizes the message of "Health for Victory" which they are carrying to housewives through nutrition clubs.

the desire for electric living in the home; and to build friendly customer relations.

In accomplishing these objectives the company's home service department, comprised of ten home economists, carry on the following activities; teach Red Cross standard and modified nutrition courses; conduct daily radio cooking school broadcast; hold home nutrition meetings; give instructions in home canning; conduct lighting lectures and demonstrations; give instructions on appliance and maintenance, and fuse replacement; and make home calls upon request to instruct customers in the proper use of appliances.

Recognizing the importance of maintaining health on the home front as a contribution to the war effort the home service department has tied in with the National Nutrition Program. Early in January, 1942, the services of the home economists to act as instructors and the use of the company's model electric kitchen auditorium were offered to the local Red Cross Chapter for conducting nutrition courses. Also, other local organizations such as the Woman's Federated Clubs, Civic and Fraternal Clubs, Girl Scouts, Parent-Teacher Associations, and Church Groups, were advised of this service in support of the war program. From this point the program went into full swing utilizing the facilities of the home service department to the fullest extent. A total of 213 Red Cross Standard and Modified classes were held during the year 1942 with an enrollment of 6390 homemakers.

In addition to the Red Cross Nutrition classes, a broad program of home nutrition parties is carried on. These parties are held in the homes of electric range users and the customer acts as hostess inviting her neighbors, friends or club members to attend. Present day topics of alternate foods, better nutrition, food extenders, correct cooking methods, balanced diets, and conservation are discussed and demonstrated. During the year 1942 a total of 969 such parties were held with an attendance of 15,000 women.

Outstanding among the activities carried on by the Home Economists is a daily 30-minute radio broadcast from the Company's all-electric kitchen auditorium. Presented on this program are timely menus and recipes, balanced diets, and proper selection, preservation and preparation of foods. In addition to the large radio audience which this program enjoys, a live audience ranging from 50 to 100 homemakers attend each broadcast.

Continuing the promotion of better lighting as a wartime necessity, the home service staff gives lectures on lighting. Theme of these lectures is conservation, proper use of equipment and care of the eyes.

In the interest of keeping existing appliances in operation until new appliances are again available, discussions on the proper care and repair of appliances are made a part of nutrition and other group meetings. A demonstration fuse panel is used for instructing customers in replacing their blown fuses.

More than 100,000 customer contacts, which have been instrumental in aiding the war program and in building an abundance of goodwill for the Company, were made during the past year.

New Orleans Sales Staff Converts to War Services

By E. N. Avegno*

THE MANAGEMENT of the Industrial Engineering and Utilization Department of New Orleans Public Service, Inc., has set forth several broad objectives to be a guide for wartime operations. These policies dictated the program now being carried on by the residential division which includes the home service group, the customer service group, sales floor group, and the dealer group.

Wartime activities include the rendering of service as efficient as possible under war conditions; the retention of friendly interest and good will of customer, and appliance and repair and maintenance.

The home service group, functioning with no reduction in personnel, has conducted meetings for various organizations such as the American Red Cross, the A. W. V. S., and the O. C. D.

For these meetings, or classes, conducted for the personnel of these important organizations, the home service group furnishes well-trained advisors to teach nutrition and give wartime food demonstrations. That these meetings are pre-eminently successful is provd by the recent request of the local Office of Price Administration to assist in taking

*Mr. Avegno is manager of the Industrial Engineering and Utilization Dept., of New Orleans Public Service, Inc.

Considerable emphasis has been placed on the maintenance of existing electrical household equipment through advertising and displays.

the meat rationing program to the people in a series of night meetings held by block leaders at schools.

Other meetings for which attendance is solicited by telephone, radio, home calls, newspaper advertisements, and direct mail are conducted in the New Orleans Public Service Auditorium for housewives and special club groups.

Subjects for these meetings include nutrition, home canning, meal planning and food preparation, point rationing, care and use of electrical appliances, and transportation. Each subject covered is replete with actual demonstration, and comments by those attending have been most enthusiastic.

Other groups and persons have been reached by meetings with Parent-Teacher Associations and school children. This last group has received very much the same type discussion as the Red Cross, A.W.V.S., and O.C.D., with the addition of other topics, as conservation of vital material, eyesight conservation, care and use of electrical and gas appliances. These meetings definitely have bearing on the health and well-being of the community and, as such, contribute to the war effort.

In addition to this activity, the home service group conducts radio programs, sale floor kitchen demonstrations, a War Bond sales booth, and appliance care and use display on the sales floor.

In the interest of rubber conservation, home calls are extremely rare, and are made only upon specific request. The customer service group has felt the manpower shortage keenly, but is being used to supplement the activities of the home service group by rendering similar services to special negro customer groups by means of group demonstrations. In order to reach large groups, a special series of night meetings are being held in negro churches on the following subjects: care and use of appliances, nutrition, food rationing, blackout regulations, eyesight conservation, and conservation of material. Appropriate charts and demonstration material are used to bring home the story. To date, more than fifty of such meetings have been held, with the average attendance of 75 adults.

The customer service group in the field handles applications for service, service investigations, and other matters where a home call is absolutely necessary.

The dealer group has been given the responsibility of helping the appliance dealers render a service as effective as possible in view of the handicaps to their normal operations as brought about by the war. Some of the activities designed to help them are:

Certified Repair Shops. This widely publicized promotion has resulted in additional revenue to the dealer, repairs for the dealers being solicited by customer service groups. All media are used to direct customers to neighborhood Certified Repair Shops.

Pay Stations in Dealer Stores: Customers of New Orleans Public Service, Inc., are directed to pay service bills at dealer stores. This creates additional store traffic for dealer and permits his sales promotion and display to reach more prospective customers. It also helps the transportation and gasoline rationing problems.

Classes for Women on Repair of Appliances. Classes are conducted to train women to replace service men who have left dealers' employ. These classes for women are conducted at the L. E. Rabouin Vocational School, and are tapping a hitherto unused reservoir of service and repair material.

The sales floor staff has felt the manpower shortage, and the limited personnel deals with customer problems of repairs, lamp bulbs, and directing customers to dealers for available merchandise. Displays on care and use of appliances, War Bonds, and nutrition center occupy space formerly used for appliances.

Bond sale booths and food conservation centers replace the appliances that were once displayed in the lobby of New Orleans Public Service.

Educational Campaigns on Customers' Food Problems

By L. F. Riegel*

ONLY a skeleton remains of the personnel of our once ample and effective merchandise sales department. Merchandise sales superintendents are now customer service supervisors and the few salesmen remaining are now known as customer service representatives. The reduction in personnel resulted from employees going to the armed forces and the loss of a few to the lure of overtime wages in the war-booming industries, and the transfer of sales department men into other departments of the company.

The present personnel keeps extremely busy in several ways: In our stores, of course, selling what few items are still on the shelves, receiving appliances for repair, and handling the problems of customers seeking electric service at locations which are not on existing lines. Others investigate these applications for service. The one branch of the sales department (other than industrial power sales) which is going full blast is the home economics department.

A few months ago we launched a "Health for Victory" club program, with the cooperation of Westinghouse. This program keeps not only our home economists busy but takes considerable time of a number of former salesmen. The program is proving very successful. Attendance is increasing and various "home front" organizations are enthusiastically cooperating.

*Mr. Riegel is general sales manager for Gulf States Utilities Company, Beaumont, Texas.

Keeping Equipment In Operation

Although responsibility for operation has been transferred from the sales to the operating department, facilities for the repair of appliances have been maintained on a satisfactory scale. This service is supplemented by advertising of a "how to take care of" character, including a customer booklet designed to help the customer to make appliances last.

Our chief concern is to retain, if possible, the nucleus of a merchandise sales organization, upon which we can quickly build the kind of sales force conditions may indicate. What we do post-war will depend largely upon what the manufacturers do. We think now that when we resume merchandising, we will direct our sales activities to new appliances and apparatus such as room coolers, ventilators, and the new quick-freezers for the home.

It looks as if it is going to be a long war, and it is unlikely that plans made now will fit. Besides,

Gulf States Utilities has concentrated its efforts on educational campaigns helping customers to solve their food problems.

we are not in the position of the manufacturer who must jump immediately into production of things for civilian needs when peace comes or lay off thousands of workmen.

What and how much merchandise will be immediately available for promotion? When manufacturers can give us an answer to that, we will add muscles and flesh to our skeleton of experienced men and start heading in the direction that seems to be most practical at that time.

We are convinced that there will be no room for non-productive fat on this post-war framework and that much of the streamlining of organization that has come about during the war will, of necessity, be carried over into peacetimes. But at the risk of seeming to be out of step, and lacking in vision, we must admit that right now we have our hands too full with helping win the war to devote much time to developing detailed plans for post-war operation which tomorrow's developments may prove highly impractical. Our thinking has been concerned with development of probable general post-war policies rather than with detailed plans involving factors we won't control.

Customer Equipment Survey Paves Way to Future Sales

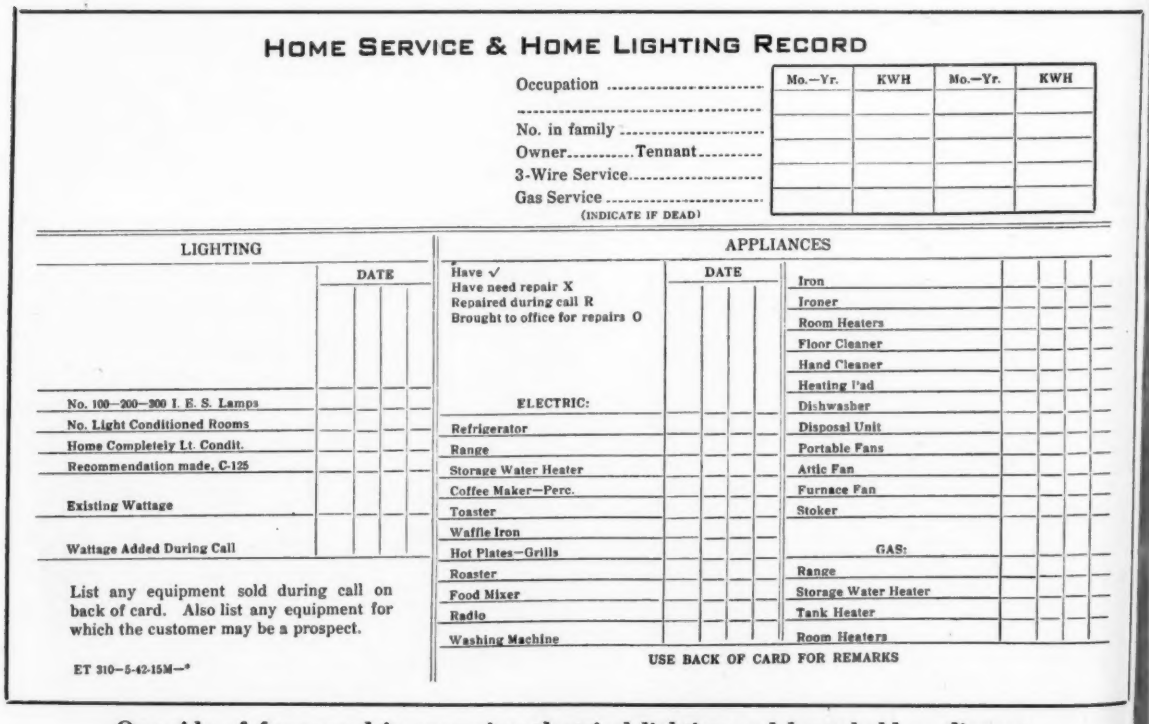
CUSTOMERS are interested in this service; to the point they even think we are trying to help them." Such was a typical report on customers' reactions to the Home Service Program instituted not long ago, by the East Tennessee Light & Power Company. Since then, because of word-of-mouth advertising by customers, radio spot announcements and newspaper advertising, the company's home service representatives have been cordially received.

The home service program was planned to shift emphasis from sales to advisory service, to assist customers on the use and maintenance of their equipment, and to create better customer relations by a more thorough understanding of utility service. This overall program was applied to each division of the company's new business department—Home Lighting Advisers, Home Service Representatives, Rural Service Engineers, Home Economist, Commercial Lighting Engineers, and Power Service Engineer. Former commission salesmen remaining with the company were placed on a salary basis.

The experience in every department has been exceptionally encouraging, but space makes it possible to discuss briefly the experiences only of the "war time" sales force.

At first each of the home service representatives experienced a little reluctance on the part of the majority of customers to allow them to explain the purpose of their calls. It seemed that customers were wondering if the assertion by the home service representative that he was only making a friendly service call, was not some new sales dodge to gain admittance. Their resistance no doubt could have been more successfully and more quickly broken down if there had been time to precede the new policy with an appropriate advertising campaign. This customer attitude, however, soon changed.

Each of the home service repre-



HOME SERVICE & HOME LIGHTING RECORD

Occupation .....
.....
No. in family .....
Owner.....Tennant.....
3-Wire Service.....
Gas Service .....
(INDICATE IF DEAD)

Mo.—Yr.	KWH	Mo.—Yr.	KWH

LIGHTING

	DATE			
No. 100—200—300 I. E. S. Lamps				
No. Light Conditioned Rooms				
Home Completely Lt. Condit.				
Recommendation made, C-125				
Existing Wattage				
Wattage Added During Call				

List any equipment sold during call on back of card. Also list any equipment for which the customer may be a prospect.

ET 310—5-42-15M—*

APPLIANCES

Have ✓
Have need repair X
Repaired during call R
Brought to office for repairs O

ELECTRIC:	DATE				GAS:	DATE			
Refrigerator					Range				
Range					Storage Water Heater				
Storage Water Heater					Tank Heater				
Coffee Maker—Perc.					Room Heaters				
Toaster									
Waffle Iron									
Hot Plates—Grills									
Roaster									
Food Mixer									
Radio									
Washing Machine									

	DATE			
Iron				
Ironer				
Room Heaters				
Floor Cleaner				
Hand Cleaner				
Heating Pad				
Dishwasher				
Disposal Unit				
Portable Fans				
Attic Fan				
Furnace Fan				
Stoker				

USE BACK OF CARD FOR REMARKS

One side of form used in surveying electrical lighting and household appliances.

sentatives was equipped with an emergency appliance "first aid" outfit. This consisted of a knife, pliers, screw driver, friction tape and, later, extra fuse plugs.

Customer call cards, like the one illustrated here, were prepared for every domestic customer. Each meter district was subdivided and a call program arranged so that visits by home service representatives and by home service advisers would be spaced approximately three to four months apart. This was designed so that all domestic customers would be visited at least twice in a twelve months period. The face of the call card is divided into two sections: one for home service representatives, with the general run of appliances used in our territory listed, and one for entries by home lighting advisers.

In making calls, the home service representatives, either by observation or by questions, ascertain what appliances the customer is using. This information is noted by check mark in the appropriate space. Inquiries are also made as to appliances owned but not in use, or appliances needing repair, with such information appropriately noted on the card.

Calls on Customers

Emphasis was at first placed on calls on customers using less than 100 kwh monthly, and it was originally planned to confine all calls to that class of customers. However, because of increasing trouble calls for minor repairs, it soon became advisable to make calls on all customers irrespective of consumption.

Other information, relative to the size of the family, occupation, consumption, etc., is also noted on the cards during the calls.

It is planned, after the war is over, to use the information provided by the cards as a prospect list. The information on hand will also serve as a means of determining when a customer is in need of a replacement.

The most important good will feature of East Tennessee Light & Power Company's home service plan is the free repair service. The representatives have repaired every imaginable type of appliance from replacing brushes on motors to the more usual and frequent repairs on iron cords, irons and refrigerator adjustments. A recapitulation of three home service representatives' calls during one four-week period follows:

Using Less than 100 kwh, 274
Using More than 100 kwh, 186
Appliances Repaired in Home, 66

Remarks by the representatives show the appliances repaired included percolator fuses, extension cords, appliance cords, range fuses, lamps, irons, hotplates, coffee makers, toasters, refrigerators, sweepers, and so on.

Indicative of the good will created are the remarks by customers at this time, almost a year after the program was instituted. One, for example, said, "This is the first time since I started using electricity twenty years ago that I've received anything free from the company." That probably is an extreme case, for in the majority of cases customers say in effect, "I've tried to get dealers to repair my appliances, but this service of yours is the first time I've been able to get them repaired."

Another important phase of this program is that in scores of instances it has been possible for the representatives to mollify the actual or imaginary complaints of various customers. Such matters as temporary outages, increase of a bill one month over another, and, what is of prime importance, personal instruction to customer on how to change fuses, have all been explained to customers with their resulting frank appreciation.

With the last major appliance units now off the market, an enlargement of the customer service plan is being instituted the first of April. This will be an Appliance Placement Service. The company will serve as a clearing house for information relative to customers wishing to purchase any type of electric appliance, or having electrical appliances for sale. No charge is being made for the service, and in addition to newspaper and radio advertising, home service representatives will carry appliance exchange coupons for customers to fill out during calls.

Conservation Problems Faced by Utilities

THE WAR and prosecution of the war effort have brought many problems to the operator of an electrical distribution system, first of which is the necessity of providing services to new industrial loads with the use of the least possible amount of such critial materials as steel and copper, reports the Public Service Company of Oklahoma. Normally, electrical companies use vast quantities of these materials, particularly copper, but as these are essentially needed for war production, such companies are making every effort to use as little of them as possible during the war. To illustrate the methods used in such conservation, we are detailing here a few of the prevailing practices of this company.

In Tulsa, for instance, we have been faced with two problems. First, the addition of a great many new houses to care for war workers brought here by our new industrial plants, and second, the serving of a great number of new war loads, most of which are additional loads installed by manufacturers already in operation here before the war.

In order to serve the new houses, it has been necessary for us to check carefully all our distribution lines to determine just how much load they could carry and still give reasonably satisfactory service to the new houses.

In the past, such lines have been so constructed that they will render service to the customer at a steady voltage and with as few interruptions as possible. To conserve copper these standards have been relaxed and the new houses are provided with service at just sufficient voltage to enable the occupants to operate their lights and appliances without trouble.

Lines were formerly designed to give the lowest possible cost over a period of time, but at present are designed to use the least amount of copper possible to provide the above minimum standard of service. In some cases we have been enabled, through the use of capacitors, to carry overloads on lines greatly beyond those contemplated in their original design. How well the above methods have worked out in Tulsa is shown by the fact that since Pearl Harbor, although we have served 2500 new houses, we have found it necessary to buy less than 20% of the transformers and 10% of the copper we would normally buy.

Since the start of the war, and particularly in the last six months, practically all the industrial concerns in Tulsa have received war contracts or sub-contracts which require additions to their manufacturing facilities. Serving of these additional loads requires, in addition to the work on lines which is much the same in character as that necessary for serving the new residential loads, careful examination of the transformer capacity available at each location. We are maintaining a continuous check on such transformers and when such a check indicates that transformers are overloaded we make even more checks to determine whether such overloads can be safely carried.

For instance, we were recently informed that a certain industrial concern was to add 100 hp in motors to its existing installation. Our previous checks show that its transformer bank was fully loaded —that is, it carried a peak load equal to its rating. In the past when such a condition arose we would install larger transformers to care for the increased load. In this instance, however, we made a recording check of the customer's load over a period of at least a week. This check showed that the transformers were fully loaded for only a few hours a day and somewhat underloaded during the balance of the day. A theoretical analysis indicated that they could carry the additional load for a period of several years without being damaged to the extent that they were likely to burn out. The installation was accordingly not changed. Such an investigation as this saved 1,000 pounds of copper and 3,000 pounds of steel for the war effort.

On other installations, it has been necessary to provide fans and blowers directed on the transformers to keep their temperature down to a safe operating level; and in still others, the customer has been prevailed upon to install capacitors on his wiring system to improve his power factor and thereby relieve the transformers of current which performed no useful work.

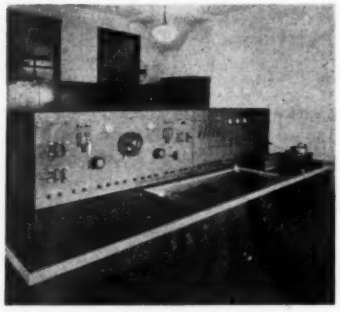
Of course this is not possible in all cases, and in the past year we have found it necessary to increase the transformer size in many cases. However, this has

(Continued on page 69)

New Meter Laboratory Has Novel Features

IN THE INTEREST of maintaining the highest degree of meter accuracy, The Virginia Electric and Power Company, with headquarters at Richmond, recently constructed in its meter department a precision testing table that is technically and otherwise modern in every detail.

The primary purpose of an electric meter department is to maintain the greatest accuracy possible on meter testing equipment consistent with all regulatory requirements. In order to obtain this accuracy, it is necessary to compare field testing equipment with some certified primary standard, and from this standard, the final accuracy of all commercial and electrical instruments derived.



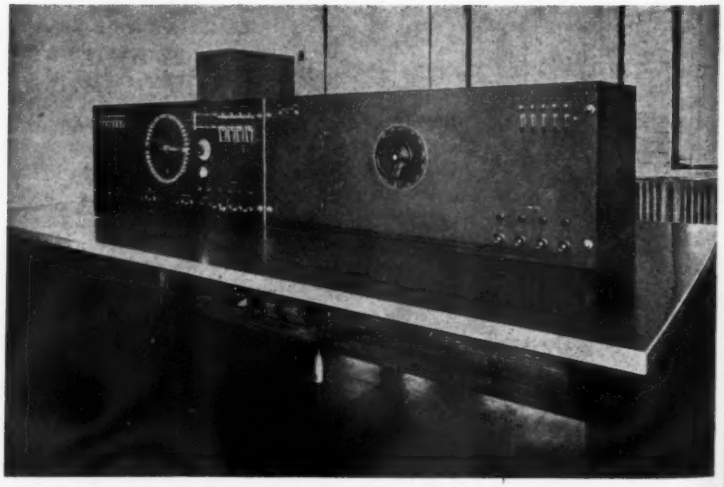
This view of the precision laboratory testing table shows the master laboratory voltmeter and wattmeter enclosed in a sunken trough and covered by sliding glass covers. The panel includes smaller instruments which permit electrical quantities to be verified before the valuable standard instruments are energized.

The large photograph is a view of the new precision laboratory testing table showing the side primarily for the testing of all rotating standards. The tapped rotary switch is part of a Knopp transformer and loading device used for obtaining a constant rotation of the master rotating standard regardless of the amount of current used when making comparison tests on other standards.

The master rotating standard is located in a well and covered with glass to prevent dust from accumulating and to prevent any possible physical damage. The zero reset of the master standard is extended outside near the left end of the table. All wiring to this standard is concealed. The rotating standard to be tested is placed on the table and its leads are connected to terminals located on the vertical panel. The panel on the right showing a circular dial provides a means of varying the voltage obtained from a variable voltage transformer. The other switches, as shown, are used for testing when necessary.

The smaller picture shows the opposite side of the precision laboratory testing table. The master laboratory voltmeter, ammeter and wattmeter are enclosed in a sunken trough and covered by

(Continued on page 69)



This view of the Virginia Electric and Power Company's new precision laboratory table shows the side used for testing all rotating standards. The master rotating standard is located in a well covered with glass and is permanently connected. The tapped rotary switch in the center of the right panel is part of a Knopp transformer and loading service.

For Continuing Achievement

A STAR FOR WESTON

—evidence that the vital instrument situation rests in good hands!

A star now adorns the ARMY-NAVY "E" pennant awarded to WESTON just 6 months ago . . . the first such pennant awarded in this highly specialized instrument field.

It's a star that has *real meaning*. Because, from the very beginning of our defense period, the responsibility for producing the vast quantities of instruments vital to the success of our country's efforts, has rested largely on the instrument leader.

This star signifies that the responsibility *rests in good hands*. "The men and women of the WESTON Electrical Instrument Corporation," writes the Chairman of the Navy Board for Production Awards, "have achieved a signal honor by continuing their splendid production in such volume as to justify this award . . . indicating their solid determination and ability to support our fighting forces with equipment necessary for victory."

But a great instrument task still remains . . . before victory is ours. So WESTON workers continue reaching for new goals . . . with the same determination, the same painstaking devotion to the quality ideal, responsible for WESTON'S *continuing leadership* in the instrument field.

WESTON ELECTRICAL INSTRUMENT CORPORATION, NEWARK, NEW JERSEY

Improving Production Efficiency In Motor Rewinding Shops

By L. H. Houck

THIS is the second of a series of three articles describing time-saving practices of the Tampa Armature Works, of Tampa, Florida.

COIL WINDING mistakes, mistakes in bringing out motor lead wires, and related troubles have always been more or less evident in well operated motor winding shops employing only able and experienced men.

When you lose these experienced men and replace most of them with women who have only had a few weeks training, and most of that in your own shop, mistakes go up at an alarming rate. It only takes a few misplaced wires, a few wrong connections, just a few 110-volt motors hooked up to run on 220, and a few running backwards, to start the profit clock running backwards, too. A pleasant shop can be quickly turned into a mad house.

J. Arthur Turner, president of the Tampa Armature Works, even though 80 per cent of his employees have gone off to war and have been replaced by inexperienced women, has reduced the number of coil winding and connection mistakes to a number smaller than that experienced before the war.

First, he designed a new work card which was described in the April issue of ELECTRICAL SOUTH, which facilitated work and made possible the use of new women employees.

In addition to acquiring a lot of inexperienced help, the volume of business increased more than 25 per cent, and this increase was taken care of satisfactorily. Despite the drastic changes experienced, the company made a profit of the kind commonly referred to as not to be sneezed at!

Back of the production end of the business was a simplified motor rewinding data card designed by Mr. Turner. In fact, there are two of the cards, one for stators and one for armatures.

The cards are on standard 5x8-inch cards and may be filed in a Kardex system or other similar filing system.

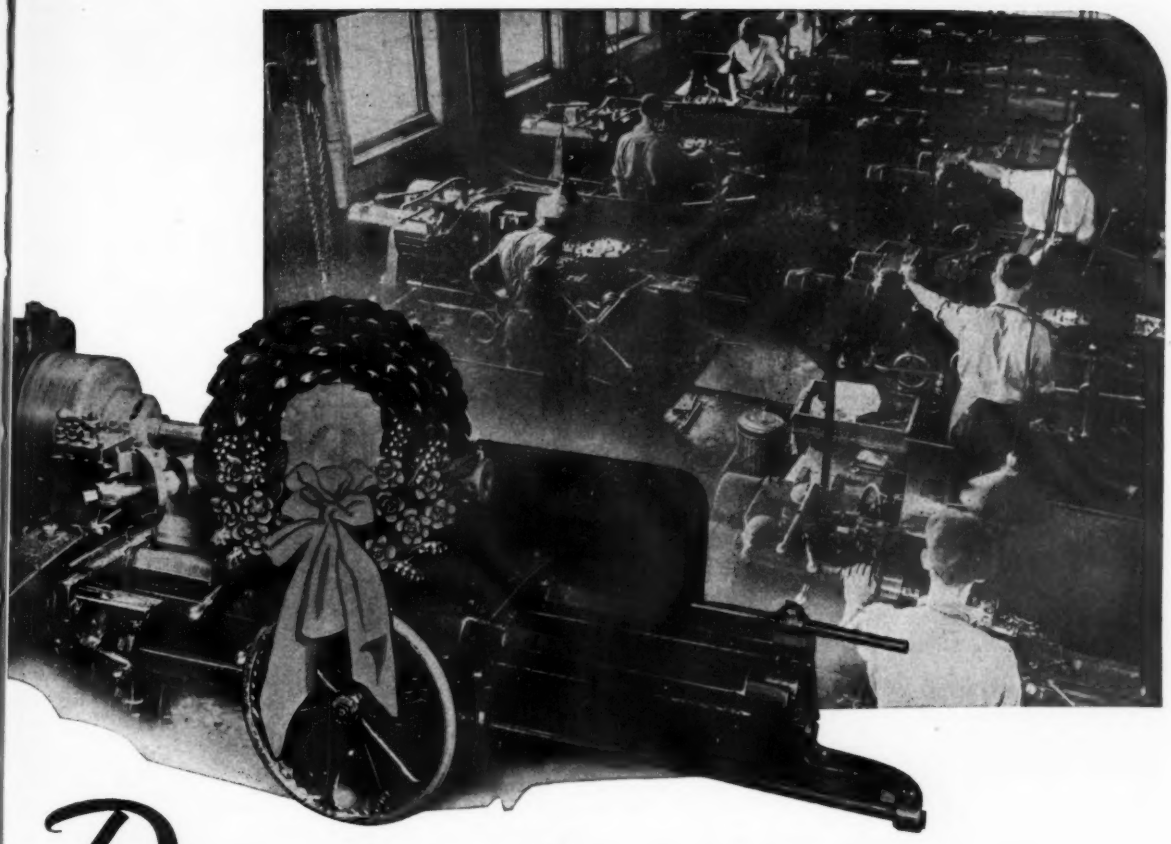
Since the data concerns motors and not customers, they are filed according to horsepower, speed, make, and style numbers of the motors. It should be remembered that these cards are permanent records of the motors. They are accumulated and remain permanently a part of the records of the shop.

The cards are master cards, not work cards. The data is copied from the master card and passed to the winders.

The data is obtained when a

TITLE NAME IN OUT Res. Phone
Pres. J. ARTHUR TURNER Jr. S-4245
Comptroller HOWARD A. LILLY H-42193
Supt. ORELAN R. CARDEN S-3272
Foreman J. LeROY VANNEMAN S-5237
Sales Eng. R. VANCE HENRY S-4225
Sub Foreman LESLIE V. WATERS S-432
Sub Foreman LOUIS T. ROUX S-764
Sub Foreman DOMONIC CAPITANO Y-5118
Sub Foreman M. SKIPPER M-1133
Secretary Mrs. RUTH CARTER H29941
Air Cond. W. T. NEYHART S-5373
Air Cond. J. O. WEAVER H10323
Air Cond. W. A. LAING S-P4643

Two time-saving devices of the Tampa Armature works are illustrated here. At left is the "in or out" indicator board which keeps telephone operator advised of the availability of key men of the organization. Below, numbered box in small motor department used to keep track of dismantled motor parts.



Decoration... for INDIFFERENCE

No medals . . . no wound stripes . . . no citations for the men on the industrial casualty lists!

They are maimed or killed . . . just as surely as if by snipers' bullets or enemy bombs . . . by carelessness, or ignorance, or indifference. And the appalling fact is that day after day these home front casualties keep mounting . . . more, many times more than are reported from the fighting fronts.

For forty years, Youngstown has had an active Safety Program in all its plants. Today, facing increased hazards of war production on the one hand and the need for maximum effective manpower on the other, we have redoubled our efforts to educate and protect our workers. We subscribe to and give our fullest support to the work of the National Safety Council.

As customer, prospect or friend, we urge that you, too, get behind this work. Enroll in the cause of the National Safety Council. Send a subscription to National Chairman Wm. A. Irwin, 71 Broadway, New York City, for the War Production Fund to Conserve Manpower. Do all you can to help America win this war on the home front.

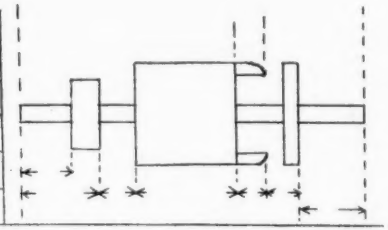
QUALITY TRADE MARK YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN, OHIO

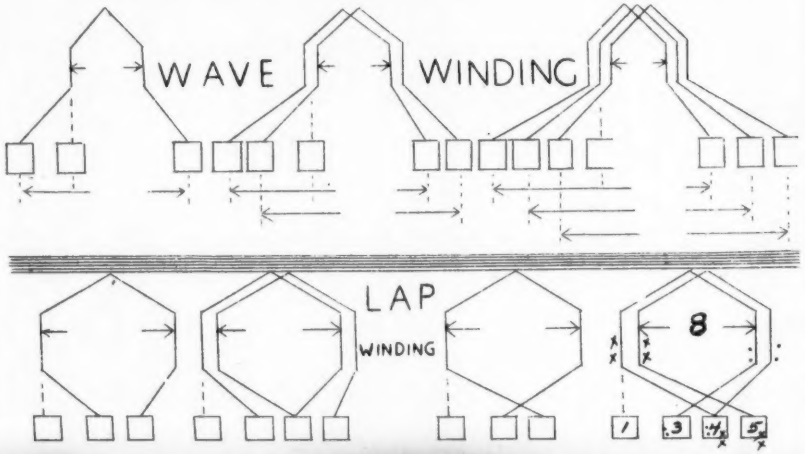
FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS

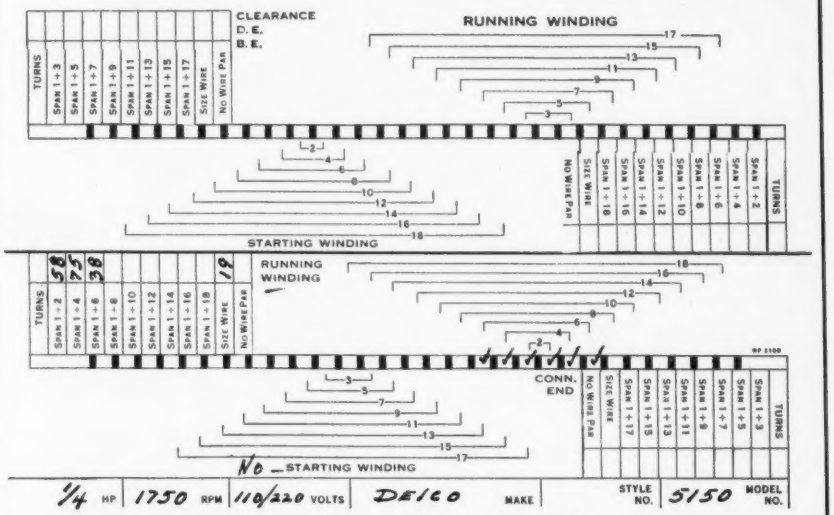
TURNS PER COIL	7
WIRE SIZE	#18
NO. WIRES IN PARALLEL	
NO. COILS PER SLOT	2
COIL-SPREAD	1+8
WAVE WINDING	



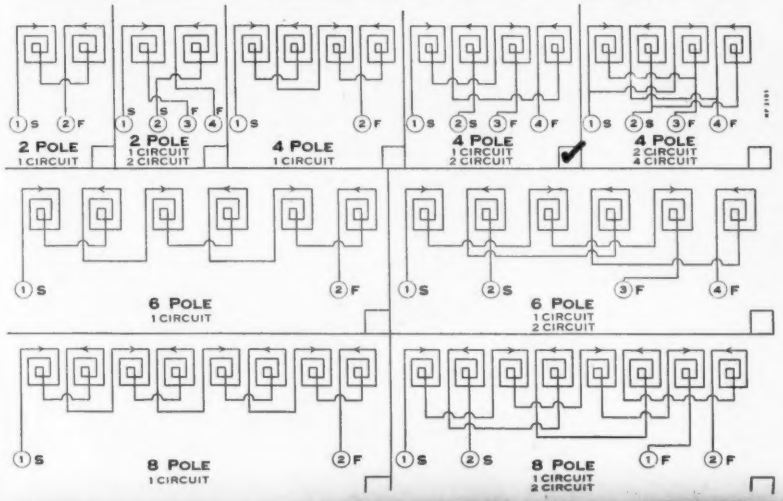
COMMUTATOR CONNECTION	1 +	AND 2 +	AND 3 +
LAP WINDING	YES		For 4 Pole Only. Connection 1 +
LEADS DO NOT CROSS--CONNECT	1 +	FROM LEFT	Connection - 1 =
LEADS DO CROSS--CONNECT	1 + 3-4-5	FROM LEFT	Total - Should
NUMBER - COMMUTATOR - BARS	56		Equal Com. Bars or Com. Bars +2
VOLT	SERIAL	STYLE	FORM
H. P. 1/4	MAKE DELCO	MODEL 5150	FRAME

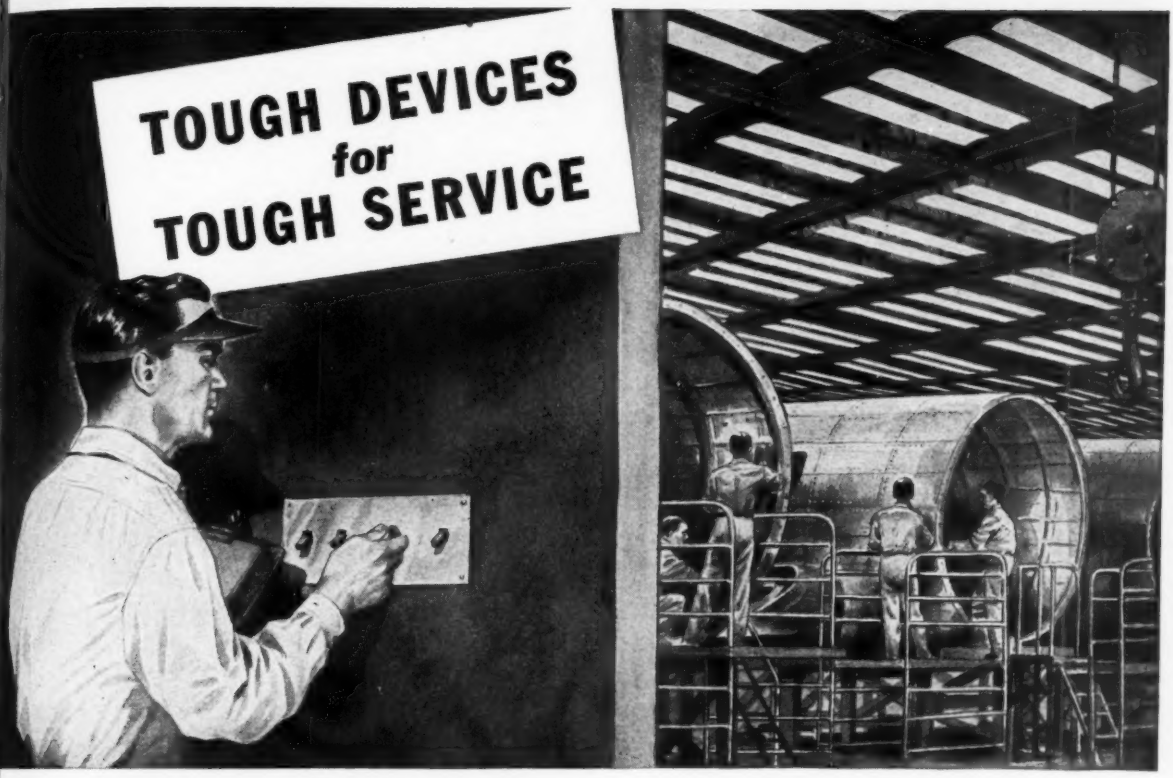
These illustrations show the front and back sides of two motor data record cards designed by the Tampa Armature Works. The cards are 5" x 8" in size and are designed so that motor data can be recorded with a minimum of entries. The cards form a permanent record of motor data and are credited by the Tampa Armature Works with saving much time





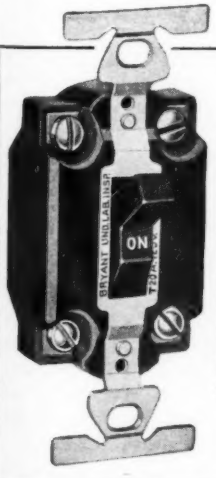
and many expensive errors in rewinding. The card at the left is for rotors while that at the right is for stators. The accompanying article describes the manner in which the cards are used by this progressive shop.


2 POLE 1 CIRCUIT
2 POLE 1 CIRCUIT 2 CIRCUIT
4 POLE 1 CIRCUIT
4 POLE 1 CIRCUIT 2 CIRCUIT
4 POLE 2 CIRCUIT 4 CIRCUIT
6 POLE 1 CIRCUIT
6 POLE 1 CIRCUIT 2 CIRCUIT
8 POLE 1 CIRCUIT
8 POLE 1 CIRCUIT 2 CIRCUIT

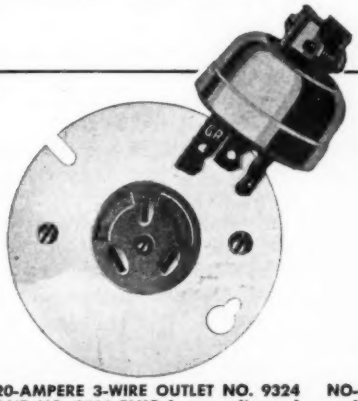


Bryant heavy duty wiring devices

Bryant industrial devices have that extra ruggedness to stand up under war time production conditions. Bryant switches, sockets, outlets, fluorescent starters and devices can all be depended upon to do their job on the production front.



SHALLOW 20-AMPERE FLUSH SWITCH NO. 5862 is made to withstand the continuous use required in industrial service today. The mechanism is enclosed in rugged bakelite. The handle is made of a special unbreakable plastic. New type mechanism insures trouble-free service. U.L. "T" rated. Conforms to Federal Specifications.



20-AMPERE 3-WIRE OUTLET NO. 9324 AND NO. 9322 PLUG for grounding and for providing electrical service to industrial equipment. Long grounding prong on PLUG assures safe grounding. Extra heavy double-sided contacts insure positive register.

NO-BLINK STARTER FS4-NA provides perfect starts and also stops blinking immediately when the lamp becomes deactivated. When a worn out lamp is replaced, the starter functions at once—automatically.

SOLD THROUGH ELECTRICAL WHOLESALERS

THE BRYANT ELECTRIC COMPANY

BRIDGEPORT, CONNECTICUT

BRYANT
SUPERIOR WIRING DEVICES

Coil winding and mica undercutting operations in the small motor department of Tampa Armature Works.

new motor goes through the shop. A master card is filled out on the motor which, when completed, gives all pertinent information such as number of turns, size of wire, with slots indicated. For instance, in the card shown, in a Delco motor, there are 38 turns of number 19 wire, span 1 and 6, in the running winding.

The forms on the cards provide for every type of motor, whether the running or starting winding starts even or odd. In assembling the data from a motor being stripped, the card forms the quickest way of checking the information because the man who puts it down only has to make a check mark in the proper places.

A real saving takes place when motors come in the second time because the data is taken from the master card instead of from the motor. This also saves time when the same type motor comes in from another customer. The important thing is that if the motor has a card in their master file, the data is taken from that and placed on a work card, which goes through the shop with the job ticket.

The front of the stator card is used for recording the coil spread, number of turns in each coil and the size of wire, and the diagrams are so arranged that an even number of slots in a starting winding and an odd number of slots in a running winding are easily recorded.

On the back of this card are connection diagrams for 2, 4, 6 and 8 pole motors. A check mark in a square in the lower right hand corner indicates the wiring diagram to be used and how the motor lead wires are to be brought out of the motor, so that they can be connected on the outside of the motor for single circuit, two circuit, or two circuit-four circuit.

The armature winding card has the same dimensions as the stator card and can also be used in Kardex or similar filing systems. Like the others, they are filed according to horsepower, speed, make, model or style number, and the winding data is recorded on the front of the card.

The back of the card contains wave and lap winding diagrams, where the coil spread and commutator connections can be indicated merely by checking in the proper place.

Mr. Turner said: "We find it better to standardize the method of marking the core and commutator and to indicate the same markings on the data card diagram. In facing the commutator, we marked the right hand slot that the armature coils lay in with an 'X' and the left hand slot with center punch markings."

You will find these markings shown on the reproduction of the back of the armature card which was filled out on a ¼-horsepower Delco.

Where a motor has two coils per slot they use two "X" marks and two center punch marks; if three per slot, three "X" marks and three punch marks.

In addition they mark the commutator bars with "X" marks and center punch marks to indicate that the coil leads connect to these particular bars. This same information is similarly indicated on the back of the armature card.

"Since we put in the data card filing system, we have practically eliminated all winding mistakes," Mr. Turner said, "and the standardizing of marking of coils and commutators has speeded up rewinding time by eliminating lost motion." (*Turn to page 68*)

WESTINGHOUSE
ELECTRIC & MANUFACTURING COMPANY

246 EAST FOURTH ST.
MANSFIELD, OHIO

May 3, 1943

POSTWAR PLANNING
WITH BOTH FEET
ON THE GROUND

When peace comes and the postwar planning you're hearing so much about now can be expressed in actual products -- what will you, as an electrical merchant, be most interested in?

First, we believe, you will want a line of products which you can get for actual selling -- fast!

It's all right to talk about new plastic refrigerators and glass ranges -- but if you have to wait for months before you can get such products, you're not going to play many tunes on your cash register meanwhile!

Second, you will want products that have acceptance. Neither you nor your customers will want to experiment with new and untried products and materials, no matter how novel and glamorous.

You can probably think of several well advertised products that didn't take"
T. J. N.

So we think postwar planning in your interest means our getting into production fast -- getting you a line of products you know will give customer satisfaction -- products that give you low selling cost, low service cost with quick turnover and profits.

To be sure, we have our share of new and revolutionary designs for ranges, refrigerators and whatnot -- and we're as far advanced with them as any patriotic manufacturer should be who is 100 per cent in the war effort.

But -- we have been in this business a long time, and we know that nobody can introduce new and revolutionary things without bugs. And bugs mean delays in getting onto the market, service expense to dealers, disappointment to customers.

How well you know it, too!
T. J. N.

So we submit that wise postwar planning in your interest should prompt us to go through two stages:

1. Get into production fast on essentially those products you have sold before -- improve, but

(over)

don't experiment then with radical changes.

2. Bring along the revolutionary new developments as quickly as they can be "proved."

You're going to hear a lot about the new appliances that are coming, postwar. You're going to be told to wait for them. You're going to be told that everything you sold in the past will be obsoleted by what's coming. And that's so -- eventually.

By arrived I mean more than "produced" I mean proved out salewise T.J.N.

All we can say is that products that are "coming" ring no cash registers until they arrive. Rushing into them may mean expense to you. We all know that the products you sold in the past gave mighty good customer satisfaction and performance. And with the huge postwar demand, what is more sensible than to give the public good, proven products -- pronto!

We hope you will agree with this outline of our thinking. We call it "Postwar planning with both feet on the ground."

Of course, there may be some radical new products in the immediate postwar period as a result of new manufacturers who haven't any time-tried prewar designs.

But we (and certain other manufacturers like us) have an experience in this business -- an experience that involves a lot of "know-how" in appliance engineering, manufacturing, and in working with and making money for dealers.

We mean G.E. Frigidaire, Kelvinator and some others T.J.N.

And we know that postwar success involves far more than merely postwar products. Your future and ours is dependent upon continued CONSUMER ACCEPTANCE. That suggests there are many things we both should be doing now for later. Our program for doing these things is outlined in a little book entitled "Your Future and Ours" which I am sending you. I should appreciate your reading it carefully and letting me have your reactions.

If you didn't get your copy please write me T.J.N.

Sincerely,

T. J. Newcomb.

T. J. Newcomb, Sales Manager
Electric Appliance Division

Increasing Motor Capacity Through Coil Reconnections

By A. C. Roe*

THE PRACTICE of utilizing all inherent capacity for increased horsepower rating, when purchasing new motors, or relocating motors, and the fact that the majority of motors have had their cycle of operation increased, means that the expected life of the windings, and other parts, has been reduced. Likewise older motors that have been in operation during pre-war production cycles, have had their hours of constant operation increased.

This all adds up to more motor winding failures. During the rewinding of these motors, all possible means and materials should be employed to produce a rebuilt unit with *maximum capacity* in order that its next stay on the firing line of production will be longer.

This article will consider all items that affect the ability of an induction motor to produce maximum horsepower, consistent with good power factor, efficiency, etc. The problems will consider possibilities for reconnecting and rewinding.

An article in the March, 1943, issue, page 48, "Short-Throw Motor Coils Conserve Critical Materials" included some points that will be enlarged upon in this discussion and new points will be added.

Increased Rating from Overvoltage

Advantage can be taken of one well known characteristic of the induction motor: the increased torque and horsepower that results from increasing the line voltage or the changing of the winding to obtain the effect of increased line voltage.

In normal times, standard practice was to allow 10 per cent overvoltage, but with Uncle Sam as the referee the rule is: "Get all the rating you can without stretching the safety factors to the breaking point." Let us then investigate what overvoltage has to offer for reconnecting or rewinding.

In Table I, a 25 per cent overvoltage indicates a 7°C reduction in temperature rise. Also, note that the stator and rotor copper losses are reduced.

Overvoltage tends to reduce the temperature rise, or if a motor has its rating increased by rating it at 50 or 55°C rise, 25% overvoltage will reduce the rise to 43° or 48°C. Thus the loading of the overvoltage motor to 50 or 55°C rise again will permit a further increase in the horsepower. Roughly, a 20 per cent overvoltage will permit 40 per cent increase in maximum capacity.

As a rule, the line voltage cannot be increased, but the turns, coil pitch, or connection, can be changed to accomplish the same condition. For example, a 6-pole, 3-phase, 220-volt motor, connected 3-parallel star, could be reconnected 2-parallel delta, which would require a line voltage of ½ (3x220x-1.73) or 190 volts. Then if the motor was operated on 220 volts, it would be operating at an overvoltage of 30/220 or approximately 13½ per cent.

The same motor, if rewound for a 220 line voltage could have the turns per phase reduced 13-1/2½% and connected 3-parallel star as originally designed. This would produce the effect of 13-1/2% over-

Table I.—Effect of Overvoltage On Motor Characteristics

Motor Characteristics	10% Overvoltage* Plus	Minus	25% Overvoltage* Plus	Minus
Power Factor, 100% Load		1¼		5
Efficiency, 100% Load	¾		1	
Slip, 100% Load		15		35
Rpm, 100% Load	1		1¾	
Starting Torque	21		56	
Maximum Torque	21		56	
Total Losses		6		10
Stator Copper Loss		17		27
Rotor Copper Loss		17		31
Magnetizing Loss	20		75	
Iron or Core Loss	18		50	
Starting Current	10		25	
Full Load Current		7		11
Temp. Rise, 100% Load		3°C		7°C

*Effect on motor characteristics is given in percent for all characteristics except Temperature Rise, which is in degrees Centegrade.

*Mr. Roe is motor engineer for Westinghouse Electric & Mfg. Co.

voltage, but in this case a saving in copper would be obtained through the use of fewer turns.

By reducing the coil pitch or chord factor, turns per phase can be reduced to obtain the effect of overvoltage. Copper is saved, and in all cases some increase in horsepower rating can be obtained.

Thus, overvoltage provides one method of rerating induction motors, and all phases of its possibilities should be checked. All of the preceding examples are based on using the same size of wire and type of insulation.

Overvoltage Connecting Tables

Since rewinding or reconnecting of lap-wound induction motors to obtain an overvoltage effect offers one of the best methods for increasing the maximum horsepower rating, Tables II, III, and IV are presented to indicate the new line voltage required for any of the possible new connections. Table II is for motors now connected for, and operating on, 110 line voltage; Table III is for 220 line voltage; Table IV is for 440 line voltage. For 550-volt motors, Table II can be used by multiplying all factors by five.

These tables are arranged with the original connection shown in the first column. To the right of this first column, each column indicates a possible connection depending upon the number of poles. The figures in each small box indicate what the new line voltage should be for each possible new connection.

The use of the table can be illustrated by considering an example of a motor to be reconnected, if possible, for overvoltage use. Assume that a motor is operating on a 220-volt circuit, and we want to obtain approximately 12 to 15 per cent overvoltage operation. The motor should therefore be arranged for operation at 220x.88=194 volts or 220x.85=187 volts. The new voltage range, therefore, is between 187 and 194. The present 3-phase, 6-pole 220-volt motor connection is 3-parallel star. Referring to Table III, on the 3-parallel star horizontal line, we proceed to the right until we find the number under 2-parallel delta. Therefore, reconnecting the motor for 2-parallel delta and operating it from a 220-volt line voltage will provide (220-192)/220 or 12.73 per cent overvoltage.

As torque increases with the square of the voltage increase, the horsepower will also increase with the torque. Therefore, the maximum increased rating in per cent is equal to E^2/L^2 where E is the overvoltage and L the line voltage. Or in the example above, L=220 and E=220 x 1.1273 or 248. Then per cent increase in torque and rating=$(248^2/220^2)$ - 1.00=27 per cent. Thus a 12-3/4 per cent overvoltage effect permits at least a 20 per cent increase in horsepower.

A study of the three tables, II, III and IV, will indicate other possible connections that will produce an overvoltage and permit increased rating. For example, in Table III a 220-volt motor connected series delta can be reconnected 2-parallel star and will require a line voltage of 190. Likewise a 220-volt motor, connected 3-parallel delta, can be reconnected 3-parallel star and will require a line voltage of 190. The 440-volt line voltage, Table IV, indicates a greater range of possibilities.

Overvoltage Warning

It is important to bear in mind, that when operating a motor on overvoltage, the motor must be loaded up to its full rated horsepower or higher. A motor operating at half load and 15 per cent overvoltage will heat up enough to burn out a Class A insulated winding. Therefore, for overvoltage the motor must be operated at its maximum rating.

When new or old motors are

Table II. — Three-Phase Motor Reconnection Chart for 110 Volts

Original 110-Volt Connection	Line Voltage Required for any Connection in this Box																	
	Series		2 Par.		3 Par.		4 Par.		5 Par.		6 Par.		8 Par.		10 Par.		12 Par.	
	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D
Series Y	110	64	55	32	37	21	28	16	22	13	18	11	14	8	11	6	9	5
Series D	190	110	95	55	63	37	48	28	38	22	32	18	24	14	19	11	16	9
2 Parallel Y	220	128	110	64	73	43	55	32	44	26	36	22	28	16	22	12	18	10
2 Parallel D	380	220	190	110	126	73	94	55	76	44	64	36	48	28	38	22	32	18
3 Parallel Y	330	192	165	96	110	64	82	48	66	39	54	33	42	24	33	18	27	15
3 Parallel D	570	330	285	165	190	110	142	82	114	66	96	54	72	42	57	33	48	27
4 Parallel Y	440	254	220	128	145	85	110	64	88	52	72	44	56	32	44	24	36	20
4 Parallel D	760	440	380	220	253	145	184	110	152	88	128	72	96	56	76	44	64	36
5 Parallel Y	550	320	275	160	183	106	137	80	110	65	90	55	70	40	55	30	45	25
5 Parallel D	950	550	475	275	316	183	237	137	190	110	160	90	120	70	90	55	80	45
6 Parallel Y	660	384	330	192	220	127	165	96	132	78	108	66	84	48	66	36	54	30
6 Parallel D	1140	660	570	330	379	220	284	165	228	132	192	108	144	84	114	66	96	54
8 Parallel Y	880	512	440	256	293	170	220	128	176	104	144	88	112	64	88	48	72	40
8 Parallel D	1520	880	760	440	506	293	368	220	304	176	256	144	192	112	152	88	128	72
10 Parallel Y	1100	640	550	320	367	213	274	160	220	130	180	110	140	80	110	60	90	50
10 Parallel D	1900	1100	950	550	633	367	474	274	380	220	320	180	240	140	190	110	160	90
12 Parallel Y	1320	768	660	384	440	255	330	192	264	156	216	132	168	96	132	72	108	60
12 Parallel D	2280	1320	1140	660	760	440	568	330	456	264	280	216	288	168	228	132	192	108

THIS IS THE SITUATION ON TAPE TODAY

As long as friction tape and splicing compound are needed for the far-flung communication systems of our Armed Forces and by the manufacturers of war products, these needs are first demands and take precedence over all others.

Anyone who needs rubber or friction tape for these purposes can still obtain Security on priority through his regular source of supply.

As a natural consequence, some of our customers with whom we have been doing business cannot get as much tape as they want as fast as they would like. We appreciate their cooperation and understanding of the situation and look forward to the day when we again can serve them as completely as before.

UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE • ROCKEFELLER CENTER • NEW YORK

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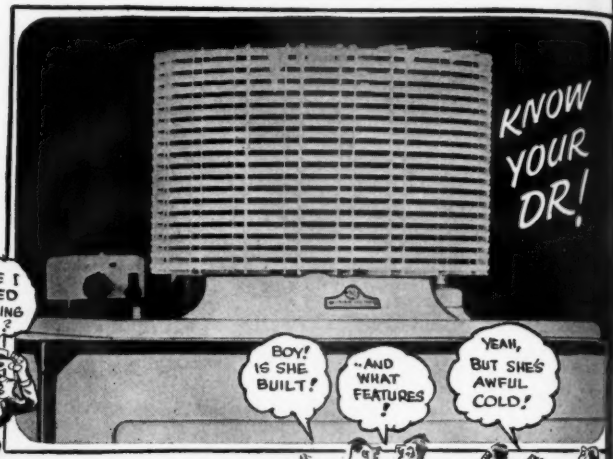
THROUGH THESE PORTALS PASS THE WORLDS BEST INFORMED SERVICE MEN



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WAR BONDS WILL BUILD AND EQUIP NEW VICTORY HOMES

...T'W AND TAKE A CHAIR!

...OF ...ROVED AIDS ...ME ...RVICE BUSINESS!

YOU'RE JUST IN TIME! DID YA BRING TH' NEXT LESSON IN TH' "T" PLAN INSTRUCTIONS ?!!
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IS THIS TH' BOOK OF THE MONTH ?
NO, THIS IS FOR THE DURATION!
APPLIANCE SERVICE HANDBOOK
COMPLETE INSTRUCTIONS On the Care and Feeding of REFRIGERATORS RANGES • WASHERS WATER HEATERS DISHWASHERS IRONERS Etc.
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THE "T" PLAN! A 10-lesson Home Study Service Course for spare time improvement. It's FREE! The "T" Plan takes front and center at the June Field Meeting but you can get details NOW from your GE Distributor.

HAPPY DAY! It's Here! The new 300 page Appliance Handbook. An all-time classic. The answers to all the common complaints on the full line of major appliances between 2 covers!

CHECK THIS LIST FOR THE NEXT G-E SERVICE TRAINING MEETING IN YOUR CITY
(If city near you is not listed, check your G-E Distributor)

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Altoona, Pa.	Findlay, Ohio	Maysville, Ky.	Saginaw, Mich.
Appleton, Wisc.	Flagstaff, Ariz.	Memphis, Tenn.	Salisbury, Md.
Ashland, Ky.	Fort Wayne, Ind.	Middlesboro, Ky.	San Bernardino, Cal.
Ashland, Ohio	Grand Rapids, Mich.	Milwaukee, Wisc.	Santa Barbara, Cal.
Atlanta, Ga.	Hagerstown, Md.	Minneapolis, Minn.	San Diego, Cal.
Atlantic City, N. J.	Harrington, Del.	Morganton, N. C.	Scranton, Pa.
Binghamton, N. Y.	Harrisburg, Pa.	Muncie, Ind.	Sioux City, Iowa
Bluefield, W. Va.	Indianapolis, Ind.	Nashville, Tenn.	Sioux Falls, S. Dak.
Cape Girardeau, Mo.	Jefferson City, Mo.	Omaha, Neb.	South Bend, Ind.
Charleston, W. Va.	Joplin, Mo.	Oxford, Ohio	Springfield, Ill.
Chattanooga, Tenn.	Kansas City, Mo.	Paducah, Ky.	St. Louis, Mo.
Chicago, Ill.	Knoxville, Tenn.	Peoria, Ill.	St. Paul, Minn.
Columbus, Ohio	La Crosse, Wisc.	Philadelphia, Pa.	Syracuse, N. Y.
Davenport, Iowa	Lancaster, Pa.	Phoenix Ariz.	Tampa, Fla.
Dayton, Ohio	Lawrenceburg, Ind.	Pittsburgh, Pa.	Terre Haute, Ind.
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Des Moines, Iowa	Long Island City, N. Y.	Queensboro, N. C.	Tucson, Ariz.
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Duluth, Minn.	Louisville, Ky.	Raleigh, N. C.	West Orange, N. J.
Evansville, Ind.	Madison, Wisc.	Reading, Pa.	Wichita, Kan.
Fargo, N. Dak.	Mason City, Iowa	Rochester, N. Y.	Wilmington, Del.

Ask your General Electric Appliance Distributor for Meeting Dates and Reservation for Yourself and Service Staff.

GENERAL ELECTRIC

...MORROW!

Table III. — Three-Phase Motor Reconnection Chart for 220 Volts

Original 220-Volt Connection	Line Voltage Required for any Connection in this Box																	
	Series		2 Par.		3 Par.		4 Par.		5 Par.		6 Par.		8 Par.		10 Par.		12 Par.	
	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D
Series Y	220	128	110	64	74	42	55	32	44	26	37	21	28	16	22	13	18	11
Series D	380	220	190	110	126	74	95	55	76	44	63	37	48	28	38	22	32	18
2 Parallel Y	440	256	220	128	148	84	110	64	88	51	73	43	55	32	44	26	36	22
2 Parallel D	760	440	380	220	252	148	190	110	152	88	126	73	94	55	76	44	64	36
3 Parallel Y	660	384	330	192	220	126	165	96	132	77	110	64	82	48	66	39	54	33
3 Parallel D	1140	660	570	330	378	220	285	165	228	132	190	110	142	82	114	66	96	54
4 Parallel Y	880	508	440	254	296	168	220	128	176	102	145	85	110	64	88	52	72	44
4 Parallel D	1520	880	760	440	504	296	380	220	304	176	253	146	184	110	152	88	128	72
5 Parallel Y	1100	640	550	320	370	210	275	160	220	128	183	106	137	80	110	65	90	55
5 Parallel D	1900	1100	950	550	630	370	475	275	380	220	316	183	237	137	190	110	160	90
6 Parallel Y	1320	768	660	384	440	256	330	192	264	154	220	127	165	96	132	78	108	66
6 Parallel D	2280	1320	1140	660	760	440	570	330	456	264	380	220	284	165	228	132	192	108
8 Parallel Y	1760	1024	880	512	586	341	440	256	352	205	293	170	220	128	176	104	144	88
8 Parallel D	3040	1760	1520	880	1013	586	760	440	608	352	506	293	368	220	304	176	256	144
10 Parallel Y	2200	1280	1100	640	733	426	550	320	440	256	367	213	274	160	220	130	180	110
10 Parallel D	3800	2200	1900	1100	1267	733	950	550	760	440	633	367	474	274	380	220	320	180
12 Parallel Y	2640	1536	1320	768	880	512	660	384	528	307	440	255	330	192	264	156	216	132
12 Parallel D	4560	2640	2280	1320	1520	880	1140	660	912	528	760	440	568	330	456	264	280	216

being rerated by the simple method of overloading to a 50° or 55°C rise, then low line voltage must be corrected, particularly on Class A insulation motors. For example, a 9 per cent reduction in line voltage would produce a 6°C rise in temperature. The stator copper losses would increase approximately 22 per cent. In such cases it would be advisable to try to reconnect the winding to produce a *slight overvoltage effect.*

Dual voltage motors with eight

(*Continued on page 67*)

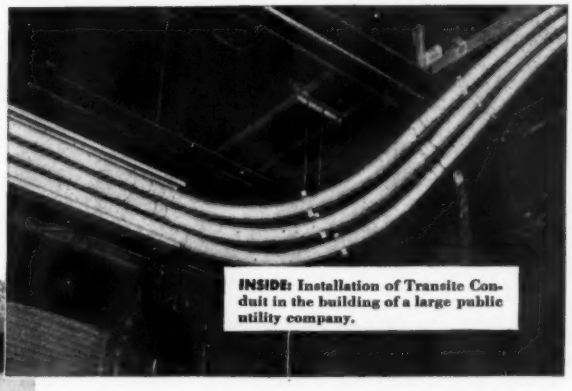
Table IV. — Three-Phase Motor Reconnection Chart for 440 Volts

Original 440-Volt Connection	Line Voltage Required for any Connection in this Box																	
	Series		2 Par.		3 Par.		4 Par.		5 Par.		6 Par.		8 Par.		10 Par.		12 Par.	
	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D	Y	D
Series Y	440	256	220	128	148	84	110	64	88	51	74	42	55	32	44	26	37	21
Series D	760	440	380	220	252	148	190	110	152	88	126	74	95	55	76	44	63	37
2 Parallel Y	880	512	440	256	296	168	220	128	176	102	148	84	110	64	88	51	73	43
2 Parallel D	1520	880	760	440	504	296	380	220	304	176	252	148	190	110	152	88	126	73
3 Parallel Y	1320	768	660	384	440	252	330	192	264	154	220	126	165	96	132	77	110	64
3 Parallel D	2280	1320	1140	660	756	440	570	330	456	264	378	220	285	165	228	132	190	110
4 Parallel Y	1760	1016	880	508	592	336	440	254	352	205	296	168	220	128	176	102	145	85
4 Parallel Y	3040	1760	1520	880	1008	592	760	440	608	352	504	296	380	220	304	176	253	145
5 Parallel Y	2200	1280	1100	640	740	420	550	320	440	256	370	210	275	160	220	128	183	106
5 Parallel D	3800	2200	1900	1100	1260	740	950	550		440	630	370	475	275	380	220	316	183
6 Parallel Y	2640	1536	1320	768	880	512	660	384	528	307	440	256	330	192	264	154	220	127
6 Parallel D	4560	2640	2280	1320	1520	880	1140	660	912	528	760	440	570	330	456	264	380	220
8 Parallel Y	3520	2048	1760	1024	1173	682	880	512	704	408	586	341	440	256	352	205	293	170
8 Parallel D	6080	3520	3040	1760	2026	1173	1520	880	1216	704	1013	586	760	440	608	352	506	293
10 Parallel Y	4400	2560	2200	1280	1467	853	1100	640	880	512	733	426	550	320	440	256	367	213
10 Parallel D	7600	4400	3800	2200	2533	1467	1900	1100	1520	880	1267	733	950	550	760	440	633	366
12 Parallel Y	5280	3072	2640	1536	1760	1024	1320	768	1056	614	880	512	660	384	528	307	440	255
12 Parallel D	9120	5280	4560	2640	3040	1760	2280	1320	1822	1056	1520	880	1140	660	912	528	760	440

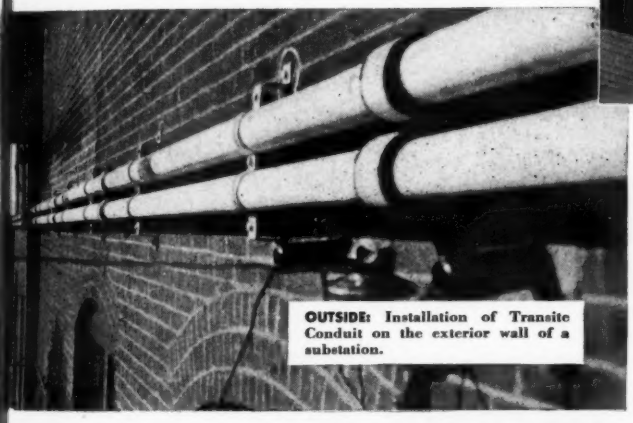
WPB Order L-225 does not apply to this modern type of Conduit...

when used Inside, Outside or Underground

J-M TRANSITE CONDUIT is a non-metallic duct offering strength, incombustibility, permanently smooth bore, elimination of electrolysis problem and ease of installation...



INSIDE: Installation of Transite Conduit in the building of a large public utility company.



OUTSIDE: Installation of Transite Conduit on the exterior wall of a substation.

UNDERGROUND: Installation of Transite Conduit for power, street lighting and signal cables.

CURRENT RESTRICTIONS imposed by General Limitation Order L-225 on the manufacture, delivery and installation of electrical conduit, tubing and raceways—do *not* apply to Johns-Manville Transite Conduit when used inside, outside or underground.

This modern type of Conduit offers many advantages for use in fire and traffic signal systems, private right-of-way installations, and underground service connections to residential and commercial buildings.

Transite Conduit is so strong that it needs no protective casing underground; withstands earth loads and traffic pressure. When "concreting in," use Transite Korduct—thinner-walled, lower-priced, otherwise identical with Conduit.

For complete details on J-M Transite Ducts, write for Data Book DS-410, Johns-Manville, 22 East 40th Street, New York, N. Y.

Johns-Manville

TRANSITE DUCTS

TRANSITE KORDUCT— for installation in concrete

TRANSITE CONDUIT— for exposed work and installation underground without a concrete encasement

NEWS of the INDUSTRY
National and Southern

Utility Executives Meet in Atlanta

Edward Tomlinson, Inter-American Analyst for The Blue Network, Inc., New York City, and Francis X. Welch, managing editor, Public Utilities Fortnightly, of Washington, D.C., are among the speakers to be heard by utility executives of the Southeast at the tenth annual conference of the Southeastern Electric Exchange to be held in the Henry Grady Hotel, May 12 and 13, Atlanta, Ga.

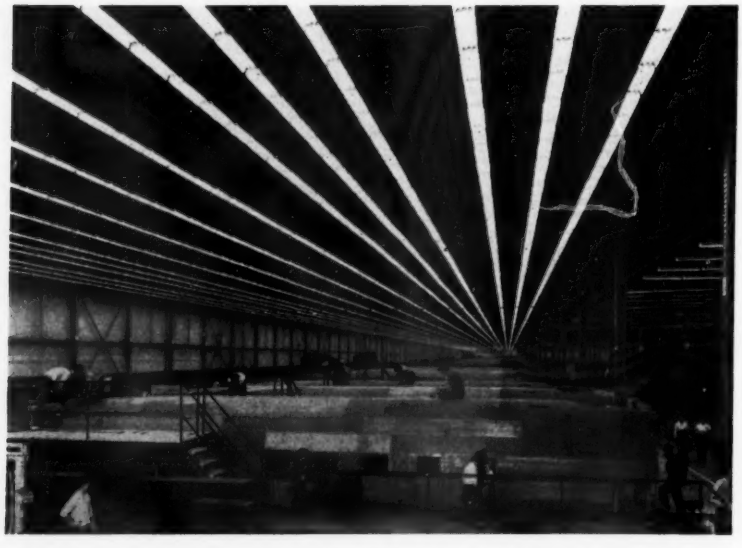
The conference, which will occupy all of Wednesday, May 12, and Thursday morning, May 13, will cover a wide range of utility problems, viewed in the light of the wartime emergency.

The Wednesday morning session will include addresses by Charles W. Kellogg, president, Edison Electric Institute, New York City; Dr. Bowman F. Ashe, regional director, War Manpower Commission, Atlanta; and M. T. Van Hecke, regional chairman, War Labor Board, Atlanta.

Following a luncheon meeting, which will be addressed by Kimsey M. Robinson, president, Washington Water Power Company, Spokane, the Wednesday afternoon session will include talks by the Honorable James W. Wolfe, vice-chairman, South Carolina Public Service Commission, and Henry B. Sargent, vice-president, Mississippi Power and Light Company, Jackson, in addition to the talk by Mr. Welch.

Mr. Tomlinson's address will be presented at the annual dinner meeting, Wednesday evening, over which Lonnie P. Sweatt, president, Southeastern Electric Exchange, will preside.

At the concluding session of the conference, Thursday morning, addresses will be made by H. Carl Wolf, president, Atlanta Gas Light Company, and regional chairman, Sixth Federal Reserve District of the Committee for Economic Development; Ashton B. Collins, Reddy Kilowatt, New York City; W. Boyd Kegg, assistant advertising director, Fortune Magazine, New York City; and Justin R. Whiting, president, The Commonwealth & Southern Corporation.



LIGHTING FOR WINDOWLESS PLANT—Austin Company engineers who designed this new windowless aircraft plant in Oklahoma eliminated two hundred tons of critical materials by the use of non-metallic lighting reflectors and 4-lamp instead of 2-lamp ballasts in the fluorescent lighting mechanism. The reflectors are masonite with synthetic white enamel surface and provide better than 55 footcandles of illumination throughout the working area which has a floor of white cement. They extend in continuous rows through the full length of this wide assembly bay, where Douglas Aircraft Company, Inc., is already producing C-47 Skytrains.

Governor Opens Valve on New Carolina Steam Plants

"The manner in which industry has responded to the challenge of war demonstrates once again the industry under private management with reasonable government supervision, is not only in keeping with the American way of life but the most productive," Governor Broughton declared recently at the opening of new units which tripled the production of the Carolina Power and Light Company's steam-driven generating plant.

The Governor operated a steam shovel on May 8, 1941, to break ground for the additional units. In April, 1943, he returned to participate in dedicatory exercises as the principal speaker and turned on the valve which set in motion two new units.

Commending the officials and employees of the power company, the governor declared that "the completion of this plant is a signal tribute to the planning of men who looked ahead to the time and emergency in which we now find ourselves."

"Through their efforts and planning," he said, "the company is now able to furnish through its facilities 532,000 horsepower of electricity to supply needs of 130,000 civilians and to meet demands of the war."

Commenting on the company's service the Governor said, "At no time has it been unable to furnish power for the many industries as well as for the large number of military posts in and near its territory. The success and capacity and efficiency of industry in America and its capable response to the demands made upon it by the war demonstrates that the American way of labor and management working together is the most democratic and productive."

The Governor was presented by Louis V. Sutton, president and general manager of the Carolina Power and Light Co.

New
FRIGIDAIRE
campaign an
outstanding success

More than 3¼ million FRIGIDAIRE booklets requested in less than 2 months!

Frigidaire's plan was announced only a few weeks ago! The second campaign advertisement has just reached the newsstands! Yet even at this early date Frigidaire's new program has created widespread interest and enthusiasm.

Frigidaire dealers hail the campaign as an exceptional good will builder. They are carrying out extensive promotions in their communities to get full benefit from the powerful appeal of Frigidaire's WARTIME SUGGESTIONS booklet. They are using it to maintain their identification with the Frigidaire business, and to build good will that will be increasingly valuable to them as time goes on!

How dealers build good will with WARTIME SUGGESTIONS

Quick to seize an opportunity, Frigidaire dealers are tying in with Frigidaire's national advertising, and are providing refrigerator users with WARTIME SUGGESTIONS booklets in many resourceful ways:

- X Giving to store visitors
- X Mailing to Frigidaire users
- X Leaving on service calls
- X Mailing to store customers
- X Giving to Home Economics classes
- X Giving to Red Cross or other groups
- X Offering in advertising
- X Distributing in cooking schools
- X Distributing through County Home Demonstration Agents
- X Offering in window displays

Every day brings thousands of requests for WARTIME SUGGESTIONS booklets from refrigerator users everywhere. Many request specific information. Others tell how proud they are of their Frigidaires and how interested they are in receiving help on today's food and refrigeration problems.

COMING! "How to make room in a crowded refrigerator" is the next timely message that will appear during May and June in Life, Ladies' Home Journal, Woman's Home Companion, Good Housekeeping, McCall's, Better Homes & Gardens, American Home, True Story and Farm Journal and Farmer's Wife, with a combined circulation of more than 27 million copies. Watch for it!

For Excellence ARMY E NAVY *in War Production*

FRIGIDAIRE Division of GENERAL MOTORS

Peacetime Builders of Home Appliances, Commercial Refrigeration, Air Conditioners

Hotpoint 'Bond Wagon' Campaign Announced

Unprecedented in advertising history, Hotpoint's "Bombers Today — Bungalows Tomorrow" campaign of 1942 is scheduled to play an "encore" in 1943 under the slogan—"Get Aboard the Bond Wagon."

In full pages in four colors, Hotpoint ads are beginning to appear in popular and home magazines. Striking color pictures of the kitchens that will be available after victory intrigue the reader who hopes some day to build a new home. Captions like "Some Day We'll Have the Electric Kitchen that Bonds Bought" and "Tomorrow Is Worth Saving For" give the wishful-thinking and planning homebuilder of tomorrow a real purpose for saving by buying the War Bonds that will make dreams come true "Tomorrow."

According to W. A. Grove, Hotpoint sales promotion and advertising manager, no campaign in Hotpoint's thirty years of electric appliance merchandising has been accorded the acclaim that the company's last year's program earned for it. Not only did electric dealers and public utilities welcome and endorse the theme and the plan, but adopted captions, illustrations and copy from the Hotpoint ads and gave hundreds of thousands of agate lines of highly desirable publicity to the bond sales effort in local daily and weekly newspapers all over America.

Official recognition by the Treasury Department was given Hotpoint for its good work in the form of a citation "for distinguished services in behalf of the War Savings Program," an honor bestowed upon the company the same week that Hotpoint factories received the Army-Navy "E" for outstanding achievement in war production.

Featured in the advertising is the tremendously popular Hotpoint Home Planning File, brought out last year

for distribution by utilities and dealers to prospective homebuilders of tomorrow for filing clippings, ideas and sketches of various phases of homebuilding.

Unexpected, but not surprising, was the great interest manifested in the campaign and its slogan by all the professions, trades and organizations connected with the homebuilding industry. Architects, builders, material companies, lumber dealers and home furnishings companies "swarmed aboard the Bond Wagon," as Mr. Grove phrases it, and contributed in no small measure to the tremendous total of advertising lineage which snow-balled around the "Bombers Today — Bungalows Tomorrow" slogan.

The 1943 "Bond Wagon" campaign will be presented this year to the entire building industry through cooperation with public utilities, recognizing the community of interests between the hundreds of thousands of families that will want to build homes after the war and the various organizations and agencies that will build and service those homes. The great appeal to the admonition to "Buy Bonds Now for Electric Kitchens Tomorrow" lies in the great wartime spread of familiarity with electric appliances for not only food preservation, but in food preparation on electric ranges, ovens, grills and galleys in army camps, navy bases and aboard the ships of the Navy and Merchant Marine.

We're On The BOND WAGON NOW!
Some Day We'll Have The ELECTRIC KITCHEN That Bonds Bought!
$4,000
Tomorrow Is Worth Saving For
BUY WAR BONDS TODAY—
HOME PLANNING FILE
ELECTRIC hotpoint KITCHENS

You Can Really LIVE in a Kitchen Like This!
...and WAR BONDS Will Help You Get It!
BUY WAR BONDS TODAY—an Electric Kitchen Tomorrow!
HOME PLANNING FILE
ELECTRIC hotpoint KITCHENS

Civilian Economy Helped By Recent WPB Orders

Actions to protect the civilian economy by permitting necessary production and distribution of essential goods and equipment, even when general production or sale of such goods is restricted, have been taken frequently by the War Production Board in recent weeks.

A survey of WPB orders during the past five weeks reveals a score or more of specific actions along these lines, taken in accordance with basic WPB policy which holds that a smoothly operating civilian economy is essential to the successful prosecution of the war.

These actions have fallen in two general categories:

(1) Arrangements for the production quotas of civilian goods in cases where inventories manufactured prior to the beginning of the war have been exhausted; or the release for general sale of limited amounts of a product from frozen stocks.

(2) Permission to use partially processed inventories, not usable in war production, for items otherwise prohibited; and limited relaxations of general restrictions to make available necessary civilian equipment or facilities.

The following recent actions are of particular interest to the electrical industry.

Mechanical Refrigerators — A total of about 150,000 household electric and gas operated refrigerators were recently released from the stockpile to meet essential needs. Purchasers, however, must certify on a government form that they have no other available refrigerating equipment.

Incandescent Lighting Fixtures—In placing drastic restrictions on the amounts of metal which can be used in the production of these lighting fixtures, WPB made it clear that partly fabricated fixtures or those now in dealer or jobber inventories can be freely disposed of. Most of these are odd pieces or discontinued stocks.

Light Bulbs—To help augment the supply of light bulbs needed in war plants and in homes, WPB relaxed its restrictions on production to permit the use of partially processed filaments for bulbs of a wattage otherwise prohibited. Another action provides machinery for more equitable distribution of electric light bulbs to civilians.

Electric Service — By amendment of Utilities Order U-1-c, electric service needed in connection with food production was brought within reach of small farms. This action was another step taken to help insure maximum food production this year.

Radio Tubes and Batteries—WPB has kept production of radio tubes available for replacement in civilian

This Advertisement, in 4 colors, appears in Collier's April 3, Life April 5, Ladies' Home Journal May, House Beautiful March, American Home April, Better Homes & Gardens June, Bride's Magazine

We're On The BOND WAGON NOW!

WE'RE rolling down that good old Victory road—full speed ahead! We figure the sooner we put every last cent we can in War Bonds, the quicker this war will be over—and we'll be able to have that new Hotpoint Electric Kitchen we want! That's why Joe and I are stretching the budget to invest even *more* than ten per cent of his pay in War Bonds. The more money we have in Bonds, the more of that thrifty, time-saving equipment we can buy for our Hotpoint Electric Kitchen when Hotpoint makes home appliances again instead of war materials!

Some Day We'll Have The ELECTRIC KITCHEN That Bonds Bought!

FOR HOMES COSTING $6,000. **The Meadow Lark Kitchen** illustrated is designed for homes costing as little as $6,000 and is completely electric, with Hotpoint Range, Refrigerator, Dishwasher, Sink and Hotpoint Steel Cabinets.

FOR HOMES COSTING AS LITTLE AS

$4,000

Hotpoint Electric Kitchens including Range, Refrigerator, Sink and Steel Cabinets have been installed in numerous homes costing only $4,000.

Tomorrow Is Worth Saving For

THERE'S a whale of a lot of incentive for you to make every sacrifice you can today! For after the war—with all the new appliances that are being perfected—the homes of America will be *finer* and cost *less* than you can imagine! Cooking will be done by Hotpoint Electric Ranges that require no watching. Electric refrigeration will be improved beyond belief... All these miracle-working conveniences can be yours—when the war is won. So speed the day of Victory—save wherever possible in order to buy more and more War Bonds.

BUY WAR BONDS TODAY—An Electric Kitchen Tomorrow!

• Kitchen hours will be cut down considerably with an automatic Hotpoint Electric Range to do the pot-watching! Vitamins and minerals will not be cooked away!

• Built to provide plenty of storage space—and keep foods at flavor peak far longer—the Hotpoint Electric Refrigerator will save time and money!

• A Ho... Dishwas... your mos... household... your chor...

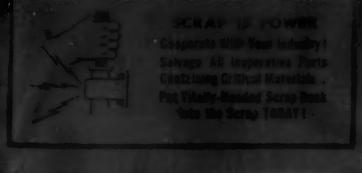
The Cost of a Hotpoint Electric Kitchen Averages About 10% of Home-B...

ELECTRIC **Hotpoint**

Now a Full Scale Offensive... Hotpoint's National War Bond Advertising Campaign

★ Stronger than ever this year! In the first half of 1943, 27 full color, full page advertisements are selling *your* community this idea: "Buy War Bonds Today—An Electric Kitchen Tomorrow!" They appear in the following 12 magazines: *Collier's, Life, Ladies' Home Journal, Country Gentleman, Farm Journal, Electricity on the Farm, American Home, Better Homes & Gardens, House Beautiful, Bride's, House Beautiful Maintenance & Building Manual, House Beautiful Guide for the Bride.*

Hop on the Hotpoint Bond Wagon! Ask your Hotpoint distributor or factory representative for the 1943 plan book, which tells you how you can support this great forward looking program in your own advertising. Edison General Electric Appliance Company, Inc., 5614 West Taylor Street, Chicago, Ill.



For outstanding achievement in War Production

sets almost as high as in peacetime. The industry has also been requested to concentrate its civilian production on certain types most in demand, even though these may be low-profit items. Through care-scheduling of production, WPB is attempting to provide a sufficient number of batteries to take care of farm radios. To conserve materials for farm radio battery production, the manufacture of batteries for portable sets has been prohibited.

Westinghouse Advertising Designed to Aid War Effort

Westinghouse Electric Appliance Division advertising for 1943 is designed to be of immediate help to the war effort, as well as build good will for the advertiser, according to Roger H. Bolin, advertising manager of the division at Mansfield, Ohio.

"Our advertising programs have been converted to an all-out war effort just as surely as have our shop facilities," Mr. Bolin said. "In peacetime, our advertising is utilized to build acceptance for and interest in our electrical appliances, such as refrigerators, electric ranges, washers, ironers and water heaters. But today, all of our advertising is dedicated to the job of helping win the war.

"We have felt that our advertising could be helpful in two ways. In the first place, during peacetime, our Home Economics Institute gained extensive experience in the field of nutrition through serving our customers. All of this nutritional 'know how' is now being used to help housewives serve more nutritious meals despite food rationing and thus preserve the health, efficiency and morale of her war-working family. A large part of our advertising program is devoted to building public interest in these better nutritional methods and eliciting inquiries for literature on this subject.

"Another job our advertising is doing is helping people take care of the appliances they now have. With the health and morale of the family depending to an appreciable extent on the efficiency of their electric appliances, it is important to keep those appliances running. Our appliance division advertising can be utilized to educate people in proper care and use. This will not only help the public take care of their appliances, but it will also eliminate many needless service calls which are now so burdensome to dealers who are under-staffed, and who have fewer repair parts available than usual. We feel that every time we can eliminate the necessity of using a new repair part we are saving that much critical material and that many productive man-hours for straight armament production."

Magazines are used as a major medium in the Westinghouse appliance division's 1943 plans. The advertising program is divided into three parts. First, nutrition advertising is built around the Westinghouse Health for Victory Club — a nutrition program for industry and the general public which aims to impart sound "eating for health" principles to the wives, mothers and homemakers of war workers. Second, "care and use" advertising is designed to make appliances last longer and serve more efficiently. Third, educational advertising offers teachers' manuals, student folders and films for classroom use in high schools and colleges.

Roger H. Bolin (right) advertising manager of the Westinghouse Electric Appliance Division, Mansfield, Ohio, uses this huge chart to review the division's 1942 advertising program and point out the 1943 plans to T. J. Newcomb (left) sales manager, and J. H. Ashbaugh, manager of the division.

WPB Regulations Now Govern Busway Design

A substantial saving in the use of steel and copper in the manufacture of busway or bus duct will be affected as a result of General Limitation Order L-273 issued recently by the War Production Board.

Busway, or bus duct, is an assembly of copper bus bars in an enclosing case or framework, used either as a secondary feeder to transmit electric power or as plug-in type to provide a flexible electrical distribution system for industrial plants.

Busway, as manufactured prior to the new order, had copper conductors based on an amperage rating of 1,000 amperes per square inch, and utilized a case which, for the most part, required considerably more steel than necessary.

Order L-273 restricts the manufacture of busway to specific amounts of copper and maximum weights of steel which may be used for each of the ampere ratings permitted under the order; and these quantities of steel and copper have been reduced to a minimum consistent with adequate performance.

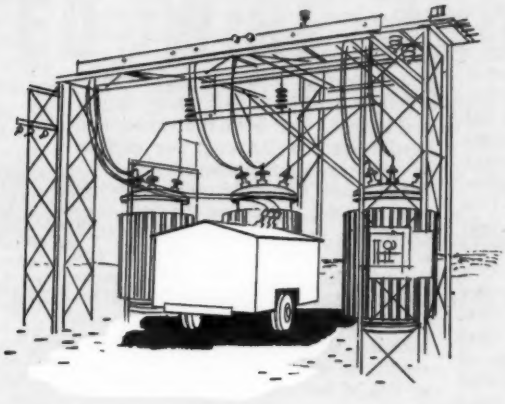
Plug-in busway is limited to three ratings with the largest being 600 amperes, and feeder sizes are permitted throughout the entire range of ratings to and including the 2,000 amperes size with larger ratings permitted only on special authorization.

The ampere ratings which have been chosen and which the manufacturer is permitted to build are carefully selected to coordinate them with other electrical equipment in a secondary distribution system. In addition to this, each manufacturer is specifically limited to the number of types he may make for each amperage rating, and changes from his standard construction are not permitted for the normal installation.

Order L-273 covers only the common types of prefabricated plug-in and feeder type busway, and does not include any type using rolling trolleys, or the so-called "step-type" busway.

Under the provisions of the Order, no busway may be ordered or delivered on a preference rating below AA-5, after April 5, and busway not complying with the steel and copper provisions of the Order may not be ordered after April 5, or delivered after May 24.

MORE KILOWATTHOURS FOR VICTORY



STAND-BY TRANSFORMERS RELEASED

...by portable capacitor bank

A leading public utility has solved the problem of increased transformer capacity with a mobile capacitor unit. With a large number of delta-connected transformer banks serving power users with lagging power-factor loads, this utility was faced with the universal problem of supplying spare transformers for stand-by service when all available transformers were needed for regular service.

To release these spare transformers, the utility and Westinghouse engineers jointly studied the application of capacitors. The result was the construction of a portable capacitor bank.

Today, portable units are vital equipment in helping this utility meet its power demands. Rolling up to a transformer bank where failure has occurred, the capacitors keep the bank of open delta-connected transformers operating at full rating. Furthermore, the same portable capacitor unit can be used for banks of different ratings—600 volts and 2400 volts. Thus, several mobile capacitor banks can release a large number of stand-by transformers of various ratings for continuous service. This idea can be used to advantage by utility systems where delta-connected transformer banks supply lagging power-factor loads of from 70 to 90%.

This is one of the many ways Westinghouse engineers can help power companies maintain service or increase capacity with a minimum expenditure of money and critical materials. They may be able to help you on similar problems. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

J-97069

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

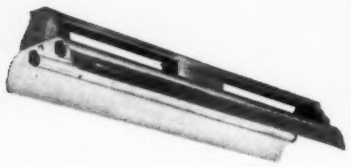
Mitchell Describes New Fluorescent Fixture

"Once again, necessity has become the mother of invention," states B. A. Mitchell, president of Mitchell Manufacturing Company, Chicago, in announcing the new "Mitchelite" line of fluorescent fixtures for war industries.

"The problem, of course, was to cooperate with the Government in saving steel and at the same time devise a unit that would give proper lighting performance and service. Anticipating further regulation of the use of steel, we started months ago to plan a new line of fluorescent fixtures that would utilize an absolute minimum amount of steel. This meant discarding tradition and taking a completely fresh approach to the problem, for we wanted the new line to do more than save steel—we wanted a fluorescent fixture that would be so simple, so flexible that it could be used for every type of installation . . . a fixture that would save installation time and be easy to service and maintain, in order to simplify the lighting problem as much as possible.

B. A. Mitchell

"The new Mitchelite fixture is stripped of every useless ounce of steel. Only those parts absolutely essential to perfect lighting performance have been utilized. As a result, the unit is in complete compliance with the latest WPB Amendment to Limitation Order L-78, dated January 26, 1943, as well as the U. S. Bureau of Standards regulations. For instance, the 40-watt Mitchelite units contain less than three pounds of steel per fixture, and the 100-watt units contain less than four pounds of steel per fixture. Yet, though lighter in weight, each unit is ruggedly built for long service. Furthermore, all Mitchelite models are Underwriters' Laboratories and E. T. L. Fleur-O-Lier approved throughout. All have high power factor and are stroboscopic corrected.



A wide range of accessories and fittings, designed to save time installing and servicing, make Mitchelite readily adaptable for every method of mounting or hanging, to fit every lighting situation in factory, office or drafting room. Each model can be used for both individual and continuous row lighting, for surface or suspension mounting.

Exclusive new-type, easy-fit wireway channel simplifies the problems of wiring and mounting for continuous rows. Units can be joined end to end in continuous rows more quickly than has been possible before. New-type wireway also permits locating ballast on "outside." This results in cooler operation and longer life of ballast. Starters and sockets are also made easily accessible, without disturbing lamps.

Reflectors are non-metal "Lumenite"—a specially-treated new composition—sturdy, moisture and high-heat resistant, non-corrosive. High gloss baked enamel finish gives high reflection factor. Reflector can easily be installed or removed from end pieces in a few seconds by a few turns of wing nuts—no tools needed.

The new Mitchelite fluorescent lighting is available in four models —each model so flexible it can be used for both individual and continuous row mounting . . . 2-light and 3-light units using 40-watt lamps . . . 2-light unit using 100-watt lamps . . . and a 2-section unit for four 100-watt lamps, which operates with only one ballast. Model No. 2075, shown here, is 50 inches long, 14 inches wide, 9½ inches high. For further information write for Mitchelite Catalog No. 400. Mitchell Manufacturing Co., Chicago, Ill.

G-E Employees Give Pledge To Men in Armed Forces

More than ten thousand men and women workers of the Bridgeport Works of the General Electric Company, assembled in an outdoor mass meeting recently to receive the Army-Navy "E" award, solemnly repeated the following pledge to the men in the armed forces:

"I will never let you down. My life is in your hands. Your life is in my hands. I will work to make the best and the most of the things you must have to win—that we both may live—that our country may live —that Freedom for all may live."

The promise, painted on a huge sign suspended on the front of the plant, was recited by employees and the recitation was recorded for broadcast by short wave to the armed forces overseas. Overhead roaring Navy planes dived in to pay tribute at intervals during the ceremony.

Conversion of the Bridgeport Works is regarded by production men as a major accomplishment because of difficulties which had to be overcome. It's a far cry from making waffle irons, washing machines, toasters, and conventional radio receivers where the tolerances are comparatively liberal, to the production of precision tools of war. Yet in the Bridgeport Works, the same personnel which had been turning out such appliances at the time of Pearl Harbor, are now making devices requiring tolerances of .0001 inch. To do this completely different type of manufacturing, new machines had to be installed. The workers (more than a third of them women) had to be trained in precision production.

All-Out War Production Committees, employees who had won awards for suggestions to improve production, and those who made possible the plant's excellent work attendance records were given particular honors during the day.

Lt. Col. H. D. Norris, U. S. Army Air Forces, in presenting the Army-Navy "E" flag said: "This plant has made the greatest changeover I have seen in a long time." Stressing the necessity for producing even more in the future, he said, "Today, both the military and the home front, is mild to what we will see once large scale operations get under way."

G. E. Plant Manager W. Stewart Clark, in receiving the "E" flag, declared that it was accepted "with due humility and with deep consciousness of the continuing obligations which are still before us all to fulfill. Our pledge to our fighting men places upon us all a solemn obligation and duty which we will discharge with credit and honor."

W. L. Batt to Address Wholesalers Conference

C. G. Pyle, managing director of the National Electrical Wholesalers Association, announces that NEWA will hold an Industry War Conference at The Hotel Statler, Buffalo, New York, on May 24-26, 1943, with William L. Batt, vice chairman of the War Production Board, as principal speaker. Mr. Batt's talk will point up the whole meeting because he will describe, from the Government's viewpoint, exactly what electrical wholesalers are doing and can do to further the war production program.

NEWA's Industry War Conference will deal with distribution problems of the electrical industry as they affect the war production program.

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INSULATED WIRE AND CABLE

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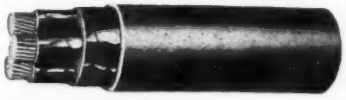

This is a "Power Age." Power is the gigantic arm of production. 90% of American industry depends on power supplied through Electrical Wire and Cable.

At the CRESCENT plant production is 100% for war purposes. When the war is over, these same unexcelled production facilities, the same skills, the same research equipment,

and the same time-tested management policies will remain coordinated to deliver to the Electrical Industry, through regular channels of distribution, the wire and cable that will be needed for the

peace-time expansion that is to come. + + + + + +

CRESCENT INSULATED WIRE & CABLE CO.

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Factory: TRENTON, N. J.—*Stocks in Principal Cities*

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Manpower Problems Discussed in Booklet

In revealing another service to help refrigeration dealers cope with the complex manpower situation involved in wartime refrigeration service, C. T. Lawson, Kelvinator's general sales manager, announced recently that the Kelvinator Division of Nash-Kelvinator Corporation has published a new booklet on the ways and means set up by the government to handle the various problems arising out of the current manpower shortage.

Called "Refrigeration Service Manpower Problems and Suggested Procedure for Meeting Them," the booklet is designed to help give appliance dealers a clear understanding of government regulations covering wages, selling price ceilings for labor charges, mechanic manpower, selective service and other phases of manpower. The new book, a follow-up to the highly successful "Simplified Training Course for Refrigerator Service Men," which was produced for dealers several months ago, is being mailed free to refrigerator retailers throughout the industry.

Explaining that the government has recognized refrigeration service as essential to the war effort, Kelvinator's book provides information on what dealers can do to help insure an adequate supply of service manpower. It includes sections on what the U. S. Employment Service can do to help; how to make replacements with persons not subject to the draft; how to provide draft boards with the kind of information they need; how to appeal draft classifications; how the 3-B classification works and how men over 38 can apply for release from the armed services.

On the matter of wage increases, the manpower book discusses the Wage Stabilization Law and how it applies to the appliance retailer.

The effect of maximum price regulations as regards service charges is another problem taken up in the manpower book. Information given on this subject includes facts on how a dealer may be entitled to a price adjustment and the proper method to use in seeking such an adjustment.

In announcing the book, Lawson said, "The Government's realization of the vital necessity of maintaining refrigeration equipment has led to the setting up of ways and means of handling the various problems arising out of the current manpower shortage. Published in a spirit of helpfulness, Kelvinator's book details and interprets these regulations and wherever possible suggests the steps which experience has shown are most effective in solving the service manpower problem. We have already mailed a copy to every major appliance dealer from coast to coast and we hope it will prove to be of valuable assistance to them."

Fan Parts Available for Maintenance and Repair

Users of portable electric fans are assured of the maintenance of such equipment, insofar as service depends upon the supply of repair and replacement parts, through provisions of General Limitation Order No. L-176 (Domestic and Commercial Electric Fans) amended early in April. Manufacturing of certain repair and replacement parts on a limited basis is provided for in the revised order, easing previous restrictions.

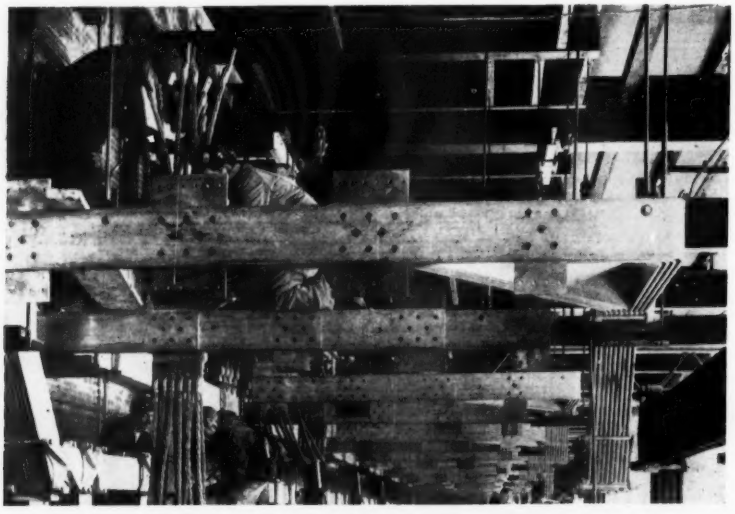
Production of electric fans has been limited to marine types for shipboard use since September 5, 1942. At the same time, sales of all fans in manufacturers' hands were prohibited except upon specific authorization of the War Production Board.

In lieu of a supply of new fans, L-176 recognizes the essentiality of maintaining existing equipment. In addition to the permitted manufacture of fan blades and electric motors, the order now also permits the use of copper and copper base alloys in the production of parts which conduct electric current. These same metals may also be used in bearings, if no other material is practicble. The manufacturer must restrict production of all parts so that his inventory does not exceed the total number of parts of each type that he had sold during the preceding six months.

Previously, only steel parts could be manufactured, prior to the revisions, production of those parts containing copper or copper base alloys was prohibited except on individual repair jobs calling for not more than two pounds of such metals.

No manufacturer or distributor may deliver a new part unless a similar used part is given to him in exchange, or unless the used part is being held by the distributor or dealer.

In effect, the person who has his fan repaired does so on an exchange basis. The dealer accepts the used part, which he has replaced with a



BUS BARS OF PURE SILVER!—Solid silver has been used throughout for the bus bars which carry power through the magnesium cells at Dow Magnesium Corporation's new Michigan plant, where magnesium metal was first produced early in April. This photograph, taken during construction, shows how the silver bus forms a virtual canopy over the cells. The silver almost completely replaces copper in the power distribution lines required for large scale production of magnesium, and was loaned by the government for this use to release copper for shells, ordnance equipment, and other war needs in which no substitute will do. The silver is even more efficient as a conductor of electricity but would not normally be used because of its excessive cost.

new one in the repair job, and holds it at the disposition of his distributor or manufacturer. If used parts are not called in within 60 days, the holder must dispose of them through regular scrap channels.

Johns-Manville Plant Flies Army-Navy "E"

More than 4,000 Johns-Manville workers and members of their families, who packed into an improvised auditorium to celebrate formal raising of the Army-Navy "E" flag over their Manville, N. J., factory, received a remarkable tribute from Major General Thomas E. Robins.

"I am convinced," General Robins said, "that you men and women of the Johns-Manville factory have a wider and more diversified part in the war effort than any other group in the United States!"

The major general, chief of the Construction Division, O. C. E., together with other Army and Navy officers inspected the Johns-Manville plant earlier in the day. The flag ceremony, staged at noon in one of the huge warehouse buildings that had been cleared for the occasion, was followed by a luncheon in which the entire plant personnel, wives, families and visitors were served.

The formal presentation of the flag, attended by a gathering of high Army and Navy officers and prominent Johns-Manville officials, took on proportions of a festival, but the machinery of vital war production was halted only briefly.

"You might say we have paused for a little while between halves," suggested President Lewis H. Brown, of Johns-Manville, one of the speakers. "There has been time for a cheer or two, and the music of the band. But when the whistle blows for the last half, we'll come out freshened, and encouraged anew, and with a production line that no interference, coached in Tokyo or Berlin, could ever disrupt!"

Southwestern Lighting Engineers Meet in Dallas

The Southwestern Region of the Illuminating Engineering Society presented the Society's national president, R. B. Brown, Jr., of Boston, as the featured speaker at its wartime lighting conference held in Dallas, Texas, on April 9 and 10. Mr. Brown discussed the extensive work done in New England on dim-out and black-out operations.

At the annual dinner meeting, Mr. Brown discussed the progress of the society from the time of World War I to World War II. Present activities were classified under two headings—production and protection.

BRUSHING UP ON ELECTRICITY—Even veteran service experts of the Westinghouse Electric Appliance Division go through a "refresher" course in electricity as part of the company's new nation-wide "Conservice" program, designed to help keep ranges, refrigerators and other appliances in operation for the duration. The men shown here are building miniature electric motors, taking the same training at Mansfield, Ohio, that they will pass on to thousands of new service workers, many of them women. From left to right are Westinghouse Service Supervisors H. E. Meyers, Atlanta, Ga.; R. J. Creech, Dallas, Texas; J. C. Alfele, St. Louis, Mo.; and R. B. Lewis, Birmingham, Ala.

Another speaker at the banquet was Jacques Carlu, eminent French architect, who is in America studying problems of post-war rehabilitation and spoke on that subject. Professor Carlu taught architecture for ten years at the Massachusetts Institute of Technology. In 1934, he returned to France as the Architect in Chief of the French Government. He described some of his outstanding work and discussed his theories of using light as an integral feature of every structure.

The conference, with sessions in the morning and afternoon, was limited to wartime lighting. P. M. Rutherford, Dallas Power & Light Co., was general chairman and presided at the banquet. W. E. Folsom, Dallas Power & Light Co., was chairman of the forenoon session and V. J. Graham, General Electric Co., Dallas, presided at the afternoon session.

Morning speakers included Mr. Rutherford, Mr. Folsom, H. G. Hrivnatz, Houston Lighting & Power Co., and R. L. Biesele, Jr., Westinghouse Electric & Mfg. Co., Dallas. Those who spoke during the afternoon were E. L. Goddard, Houston Lighting & Power Co.; W. M. Larkin, Gulf States Utilities Co., Beaumont; A. H. Gray, Jr., Southwestern Gas & Electric Co., Shreveport; Lieut. Pope Lawrence, Texas State Board of Health, Austin; L. V. Maxson, Crouse-Hinds Co., Dallas; and Logan Knapp, Dallas Power & Light Company.

Walter G. Moore, left, vice president of Dallas Power & Light Co., presents a Texas ten-gallon hat to R. B. Brown, Jr., president of the Illuminating Engineering Society, at the Wartime Lighting Conference of the Southwestern Region, IES, in Dallas, April 9 and 10.

Incandescent Fixtures Affected by WPB Order

In a move to channel all incandescent lighting fixtures into war work or defense housing and other essential civilian uses, and to conserve critical materials, the War Production Board has issued Limitation Order L-212.

It is estimated that the order will result in the saving of from 2,500 to 3,000 tons of ferrous metal this year. This saving will be effected in various ways.

(1) The amount of metal per-

BRYANT ENGINEER HONORED—Charles H. Hodgkins, acting manager of engineering at the wiring device plant of the Bryant Electric Company, has been awarded the Westinghouse Order of Merit. H. E. Seim, vice president and general manager, is shown here at right presenting Mr. Hodgkins with a certificate of honor and a bronze medal bearing a silver "W" and the inscription "Whom his fellow men delight to honor." Fourth Bryant employee to receive the award, Mr. Hodgkins was cited for the high quality of his engineering imagination, which has led to the practical commercial development of many ingenious devices for the control of electric ranges, fluorescent lamps, and other wiring applications.

mitted in the manufacture of standard utility and industrial incandescent lighting fixtures is reduced about 60 per cent.

(2) The amount of metal permitted in residential type fixtures is reduced about 80 per cent.

(3) Certain simplifications and a reduction in the number of sizes and shapes permitted to be produced are ordered.

The new regulation restricts the sale of industrial and utility lighting fixtures to orders carrying a preference rating of A-1-j or better. However, sales of fixtures made of materials acquired prior to the date of the order are not restricted.

No restrictions are placed on partly fabricated fixtures, or on fixtures now in inventories held by dealers and jobbers. It was felt that most of such fixtures were not essential to the war program, being odd pieces or discontinued types.

The most drastic cut in the use of ferrous metal is the limiting of residential fixture manufacturers to the use of only six ounces of metal per fixture. This amount is sufficient, however, to permit glass, vitreous porcelain and other non-metallic materials used in making residential type fixtures to be attached to electrical outlets or building structure.

Some manufacturers already have developed residential fixtures using slightly less than six ounces of ferrous metal and have incorporated in the fixture both eye appeal and efficiency, as well as maintaining good lighting standards in their products.

Unlike industrial and utility lighting fixtures, the residential fixtures will not require a priority rating to be purchased. Residential fixture manufacturers will be allotted raw materials under the Controlled Materials Plan to manufacture a sufficient number of fixtures for the defense housing plan and for the most essential civilian needs.

Hotpoint Factories Get Army-Navy "E"

Less than a year from the day Hotpoint factories, in Chicago, made their last domestic electric range, water heater and dishwasher, and began conversion to 100 per cent war production, the Army-Navy "E" emblem of high achievement in production of war goods, was conferred upon the company and its several thousand employees.

In a formal ceremony at the Cicero stadium, Nineteenth Street and Laramie Avenue, on Monday, March 29, with Hotpoint officials, district managers, employees and ranking Army and Navy men in attendance, President A. D. Byler received the flag of honor from the hands of Col. John Slezak, of Chicago Ordnance District.

Representing the Navy at the presentation, Commander J. A. Field conferred the Army-Navy "E" pins to be worn by the workers in a speech to which James Dunn, chairman of the Factory Council, and Edward Zelinski, chairman of the Office Council, responded.

Master of ceremonies was Norman Ross, NBC news commentator, and formal raising of the colors was performed by a color guard from the United States Marines.

Basic Utilities Order Is Amended by WPB

A new certification form to be used by electric, gas, water and steam utilities on their purchase orders for maintenance, repair and operating supplies is provided in Utilities Order U-1, as amended in April by the War Production Board.

A number of other changes were made in U-1, which is the basic utilities order. All are changes in detail, and do not affect the major provisions of the order, which governs the flow of materials in the utilities field, with the exception of communications.

Among the more important changes are:

Preference ratings assigned to U-1 may not be used to obtain materials on a new list E attached to the order, including such items as automotive replacement parts, printing, office equipment, and certain types of safety equipment.

A number of changes are made in provisions of U-1 relating to minimum inventory requirements to permit more elasticity for seasonal variations. Consequence of the changes is to permit withdrawals on an annual basis rather than by calendar quarters.

Several clarifications in the language of the order also have been made.

Recent Publications

1942 Book of ASTM Standards

Published by the American Society for Testing Materials, 260 South Broad Street, Philadelphia, Pa. In three parts, price of each part, $9.00. For half-leather binding add $1.00 extra for each part.

This recently completed 1942 book of ASTM Standards, issued in three parts, contains the latest approved form of the widely used specifications and tests from materials, definitions, and recommended practices of the American Society for Testing Materials.

This latest addition has 1090 specifications and standard methods which cover more than 4900 pages. Contin-

AWARD FOR SAFETY—In a ceremony held April 12, in the yard of the Boston Street Plant of Sylvania Electric Products Incorporated, Salem, Mass., employees of that plant were accorded public recognition by the management for their remarkable achievement in working two and one-half years without a lost-time accident. This period of time represents 3,332,000 man-hours of safe working. This unusually good safety record won for the Boston Street plant of Sylvania the Grand Trophy awarded by the Massachusetts Safety Council. The plaque was presented to the management by Leverett Saltonstall, Governor of Massachusetts. R. E. Barrett, at left, is shown receiving the plaque from the governor.

uing the Society's policy, the latest edition gives all specifications, whether formal standards or tentative.

The Standard is issued in three parts, the divisions being as follows: Part I, Metals; Part II, Non-metallic Materials, Constructional; and Part III, Non-metallic Materials, General. Each part of the 1942 book has a complete subject index.

To keep the books up to date in 1943 and 1944, a supplement will be issued to each part in each of these years. The charge for the supplement is $3.00 for each part for each year —for half-leather binding, add $1 extra for each supplement part.

Arc Welding— Job Training Units

By the Staff of the Dunwoody Industrial Institute. Published by American Technical Society, Drexel Avenue at 58th Street, Chicago, Illinois. 103 pages, illustrated, spiral wire binding. Price, $1.25.

This training manual is one of two dealing with welding. The companion manual, which sells for the same price, takes up the subject of gas welding.

Several pages of suggestions and helps on the use of these manuals are included in each. The Arc Welding Unit consists of 40 jobs with an information sheet and a sheet of check-up questions for the first 32 jobs. A job information sheet is furnished with the last eight jobs. Numerous illustrations make the text easy to follow and explain the welding symbols used.

The best recommendation for these manuals is the fact that they have been tested on the job in industry and in schools both before and since the war began.

Foremanship and Safety

By C. M. MacMillan. Published by John Wiley and Sons, Inc., 440 Fourth Avenue, New York City, N. Y. 101 pages, illustrated. Price, $1.00.

"In war-time, production with safety may be the deciding factor in the conflict," says Mr. MacMillan, the author, who is associate engineer, Safety and Security Branch, of the Office of Chief of Ordnance, War Department. "Production without safety may be as direct an aid to the foes of our country as direct sabotage. Whenever a man is absent from the production line, the output necessarily lessens."

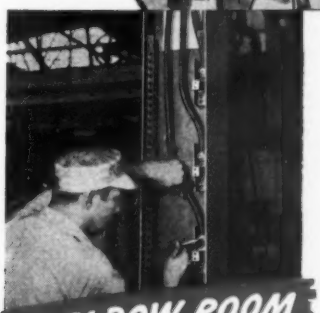
With this introduction, the author points out the dependence of any safety program upon the foreman. After a brief discussion of the personal relations between foremen and workers, there follows a series of 25 chapters crammed with facts relating to safety in industry. Every foreman and safety engineer will benefit from a careful study of this publication.

HOW TO DO 4 HOURS WORK IN 3

BullDog Narrow Column Circuit Breaker Panels—a Quick Windup to Wiring Jobs

1-ONE MAN JOB

Light, compact pieces—no heavy or complicated parts that take more than one man's time to install.

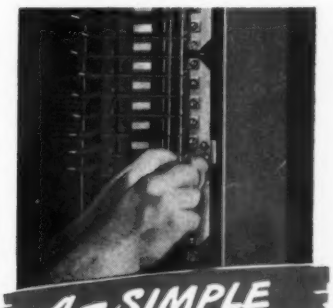


2-ELBOW ROOM

Wireman not slowed by having to work in narrow "side" gutters as cables are pulled and connected.

3-CLEAR VIEW

Work is faster, surer, as branch circuit wires are led to retainers — no groping or guesswork.



4-SIMPLE

Major wiring job done in an empty cabinet — panel is set and connections made to main cables.

5-NO SOLDER

Branch wires are readily inserted and tightened in the Solderless Wire Grips.

Now is the time when plants *must* cut every corner, to save precious maintenance time. BullDog's Narrow Column Panels meet industry's wartime need for speed of installation and ease of upkeep. Write for complete bulletin No. 426, covering various types of BullDog time and money-saving equipment.

MANUFACTURERS OF Vacu-Break Safety Switches, SafToFuse Panelboards, Circuit Master Breakers, Switchboards, Bus Duct Systems—FOR LIGHT AND POWER.

BULLDOG
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Detroit, Michigan

BullDog Electric Products of Canada, Ltd., Toronto, Ontario

Field Engineering Offices in All Principal Cities

PERSONAL NOTES
About Men You Know

S. E. Bramer, president of Copperweld Steel Company, recently announced the appointment of **William J. McIlvane** as vice-president in charge of sales and assistant to the president. Mr. McIlvane was formerly general manager of sales for Copperweld.

* * *

W. J. McIlvane, vice president in charge of sales of Copperweld Steel Company announces that **Harry J. Billica** has joined the Copperweld sales organization. Mr. Billica was formerly senior industrial specialist in WPB's office of War Utilities, at Washington, D. C. Before his association with WPB, Mr. Billica was sales engineer for the Indiana Steel and Wire Company, and prior to that he was associated with Graybar Electric Company, as Pacific district line material manager.

* * *

T. C. Wescott, engineering manager, and **Harold H. Scaff,** comptroller, have been elected vice presidents of Ebasco Services Incorporated, the service organization of Electric Bond and Share Company, according to an announcement made recently.

* * *

The new Fairmont, W. Va., works of the Westinghouse Lamp Division, Bloomfield, N. J., which includes Westinghouse's large fluorescent lamp plant, will be managed by **John Rosevear,** veteran engineer, **Ralph C. Stuart,** manager of manufacturing and engineering, recently announced. As manager at Fairmont, Mr. Rosevear will coordinate the manufacturing activities of the fluorescent plant, the new glass factory now being built and an electronic tube plant.

A veteran of 21 years with Westinghouse, he formerly held the position of staff assistant in the Industrial Engineering and Equipment Department of the Lamp Division with headquarters in Bloomfield.

Mr. Rosevear joined Westinghouse in 1922 as an electrical draftsman, and in 1928 was appointed general foreman of construction and engineering. In 1932 he became assistant works engineer and two years ago was appointed superintendent of works engineering. He attended Stevens Institute of Technology and Lafayette College and was associated with several mining companies before entering the electrical industry.

* * *

J. U. Tatum has been appointed service manager of the Southeastern District of Graybar Electric Company, to succeed **H. J. McKnight,** who died in February. Mr. Tatum is a graduate of the University of Richmond, 1926, and has been with the Graybar Electric Company since October, 1926. After spending some time in the warehouse and service department at Richmond, he was transferred to Durham as service supervisor, in 1930, where he remained until 1935, when he returned to Richmond as manager of the utility and supply department.

J. U. Tatum

* * *

Lloyd Arnold has been named assistant to vice-president, finance, of American Steel & Wire Co., subsidiary of U. S. Steel Corp. At the same time, **Ralph Raymond** has been appointed supervisor of organization planning, succeeding Mr. Arnold.

Born and educated in Cleveland, Ohio, Mr. Arnold first started working for American Steel & Wire in November, 1900, when he was employed as a clerk in the stores division at American Works. He held various positions in Cleveland before being transferred to the Shoenberger Works at Pittsburgh, Pa., in April, 1918. He subsequently was employed at the Farrell Works and the Rankin Works before being transferred back to Cleveland with duties in the auditor's office. In October, 1938, he was appointed supervisor of organization planning.

* * *

Max W. Babb, chairman of the board of the Allis-Chalmers Mfg. Company, one of the nation's largest builders of war machinery, died March 13 in Milwaukee after an illness of several weeks. Mr. Babb, who had been board chairman since January, 1942, and the company's president for the ten years prior to that, was 68 years old.

He joined the Allis-Chalmers organization in 1904 as the company's attorney. He had practiced law in Iowa with his father after receiving his law degree from the University of Michigan in 1897. He obtained his bachelor of arts degree at Iowa Wesleyan in Mt. Pleasant, where he was born in 1874.

In 1913, Mr. Babb was made vice-president and general attorney of Allis-Chalmers, and was closely associated with the late General Otto H. Falk in the management of the concern which underwent tremendous expansion during and after the World War. He succeeded Gen. Falk as president in 1932 when Falk became chairman of the board.

W. J. McIlvane

T. C. Wescott

H. H. Scaff

Max W. Babb

Would you turn your back on a wounded Soldier?

You think you wouldn't... you don't mean to...

But unless you are giving every precious minute of your time... every ounce of strength that you can spare... towards helping win this war as a civilian, you are letting down those soldiers who are sacrificing lives to win it for you.

What you are asked to give up isn't much compared with what they're giving up. The extra work you undertake is small compared with the gigantic effort they are making. But to a wounded soldier, what you do can mean the difference between life and death.

You make the choice.

LOOK AROUND YOU! *Pick your war activity—and get into it! In your local Citizens Service Corps or Defense Council there is something for every man, woman and child to do. If no such groups exist in your community, help to organize them. Write to this magazine for free booklet, "You and the War," telling what you can do to help defeat the Axis. Find your job—and give it all you've got!*

Contributed by the Magazine Publishers of America

EVERY CIVILIAN A FIGHTER

NEW EQUIPMENT and MATERIALS

Panelboard Bulletin

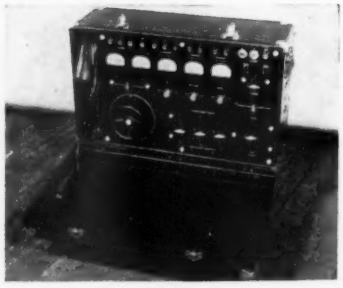
Frank Adams Electric Co., St. Louis, Mo., has issued an information bulletin on panelboards and cabinets. This bulletin contains much valuable information on panelboards and cabinets that will be of interest and of help to contractors and engineers particularly. It does not list any prices but is a companion bulletin to bulletins No. 63 and No. 67, which list prices of the various types of panelboards. This information bulletin should be filed with these other bulletins for ready reference. Copies are available upon request.

Test Kit for Network Protectors

To test relays and electrical operation of 125/216 volt secondary network protectors, a new portable test kit has been announced by Westinghouse Electric and Manufacturing Company.

The kit is designed for routine testing in the field. Variable currents and variable voltage for relay testing and mechanism operation are obtained by means of fixed resistors, a transformer, and a variable auto-transformer designed for smooth, continuous control of voltage.

Other equipment in the portable test kit include voltmeters to check line voltage, relay phasing voltage and operating mechanism test voltages; ammeters to check the relay



reverse current; switches to alter all circuits necessary to test the master relay, phasing relay and operating mechanism for closing and tripping; red and green indicating lights to show "close" and "trip" positions of relay contacts; fuses to protect the supply circuit, variable auto-transformer and the low range ammeter; and supply and test leads.

All equipment is contained in a plywood and fibre portable case measuring 15 x 11 x 26 inches and weighing 92 pounds.

"Uni-Shell" Line of Motors

After thirty months of development, Robbins & Myers, Inc., Springfield, Ohio, announces their new line of Uni-Shell Electric Motors—a complete line in which all motor types in any one frame size are interchangeable.

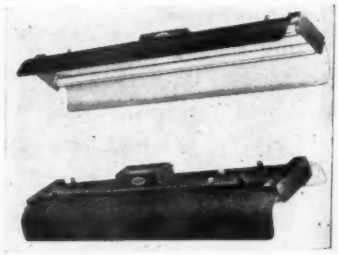
All Uni-Shell motors are built within cylindrical shells of steel. In any one frame size, the shell dimensions, head fit, bolt circle holes, shaft size and conduit box mountings are identical for all motor types. This is true of polyphase induction motors, capacitor start induction motors, standard d-c motors and generators, repulsion induction motors, as well as other types. Where one type of Uni-Shell motor can be mounted, so can any!

The advantages of the Uni-Shell's interchangeability are obvious. The manufacturer of motor-driven products may have an occasional demand for motors other than the polyphase induction type. If the requirement calls for direct current or single phase motors, he would ordinarily have to redesign his product to accommodate their different exterior dimensions. Uni-Shell motors, by contrast, have identical dimensions in any one frame size—except for slightly different end heads necessary to different motor types. In 99 per cent of the cases, any Uni-Shell motor may be mounted where another type Uni-Shell motor was mounted before. Pictured here, left to right, are polyphase, direct current, and repulsion induction motors with covers added. Note uniform appearance of all motor types.

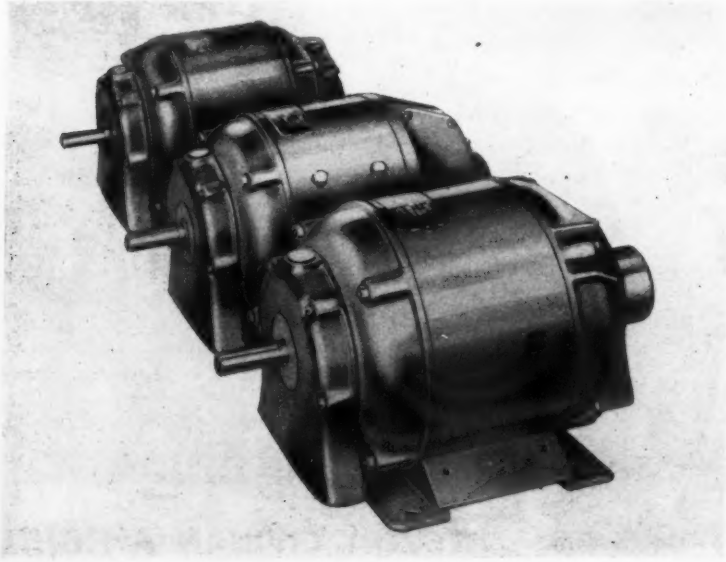
A 20-page booklet illustrating and describing all features and improvements of Uni-Shell motors in detail, may be obtained by writing Robbins & Myers, Inc., Springfield, Ohio.

Silv-A-King Reflectors

To meet the demand for efficient fluorescent lighting equipment and, at the same time, to conserve steel and other metals, the makers of Silv-A-King lighting and equipment offer two new "Victory" reflectors made of Silv-A-Tex—a specially developed, lightweight, sturdy composition that resists heat, moisture and corrosion.



Silv-A-King "Victory" units conform to Fluorescent Limitation Order L-78, and amendments. The reflecting surface is finished with high-gloss, chip-proof, baked white enamel that is comparable in lighting efficiency and reflectivity to porcelain enamel, and meets all RLM requirements. The units are made for either chain or rigid suspension in two models—"Victory 40," a two- or three-lamp, 40-watt unit, and "Victory 100," a two-lamp, 100-watt unit. Both units are available for prompt delivery on priority orders.



and Silv-A-Tex non-metallic reflectors may be purchased separately if desired.

Special literature describing these new Silv-A-King units and giving complete specifications and prices may be obtained by requesting Catalog 43-V from Bright Light Reflector Company, Inc., Brooklyn, N. Y.

Portable Fluorescents

A new Bulletin (F-63) covering portable lighting units for fluorescent lamps has just been issued by Day-Brite Lighting, Inc., of St. Louis. This bulletin illustrates the "Midget", a hand-type unit for one 6-watt lamp; the "Skidway", a floor and hang-up type unit for two 20-watt lamps; the "Crawler", a floor-type unit illustrated here for two and four 40-watt lamps; and the "Hiboy", a telescoping pedestal type unit for four 40-watt lamps. The 40-watt lamp units are listed with either wire safety-screen or vapor-tight plastic covers.

This line of equipment is designed for use in various war production plants for assembly, maintenance and servicing operations and the wide range of sizes makes available a fixture for practically every operation and location.

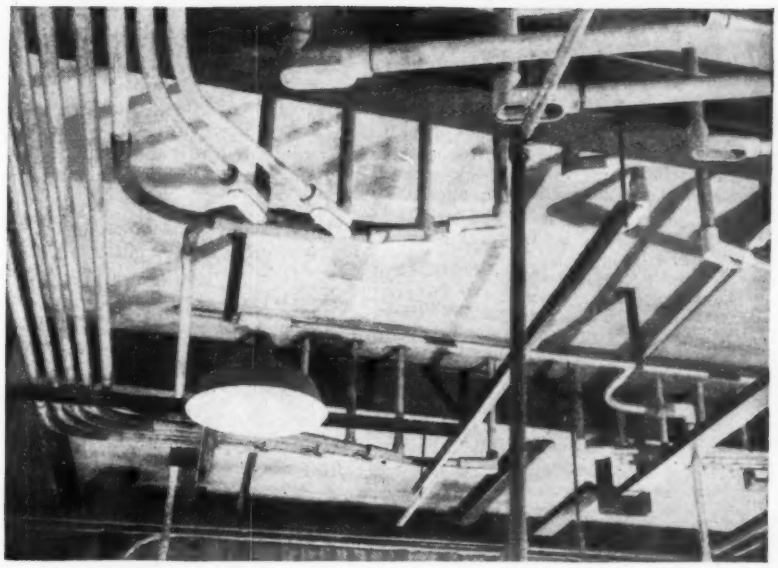
Additional demand for this equipment should be felt for use by the various repair and maintenance depots that are maintained throughout the country for the servicing of the mechanized equipment of the Army.

Copies of Bulletin F-63 are available upon request to Day-Brite Lighting, Inc., St. Louis, Mo.

Electronic Contactors

G-E ignitron contactors for fast, accurate power switching of a-c resistance welding machines are described in a new, illustrated 8-page bulletin (GEA-3058B) issued by the General Electric Company. The bulletin outlines the many desirable features of these electronic contactors and describes and illustrates their construction, the ease with which they can be installed, and the simplicity of their operation.

The publication also illustrates three standard electronic contactors —the 150-, the 300-, and the 1,200-ampere sizes. In addition, it lists the four principal ways in which these contactors may be used to best advantage for the control of a-c resistance welders.



Use G-E Rigid Conduit

To Protect Wiring in Hazardous or Wet Locations

Two G-E rigid conduits are available to help guard against electrical breakdowns in war production plants. Both are high quality. G-E White is hot-dipped galvanized. G-E Black is coated with a corrosion-resistant enamel.

WPB Limitation Order L-225 permits the following uses for rigid conduit: (Type of protective coating is not restricted.)

1. In war implements such as warships, aircraft armament, tanks, etc.

2. In projects rated A-1-J or better for hazardous or wet locations (with conduit size limitations).

Use these protective conduits for maintenance work . . . for conversion wiring . . . for new war wiring. Also G-E electrical metallic tubing and G-E flexible metal conduit are available for use in certain locations in accordance with WPB Limitation Order L-225.

. . . . . .

For further information see the nearest G-E Merchandise Distributor or write to Section C532-16, Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.

GENERAL ELECTRIC

Hydraulic Equipment

To meet war-time buying problems, Blackhawk Mfg. Co., has issued a new Hydraulic Equipment Catalog listing only those items scheduled for production. By omitting products "discontinued for the duration"—the book aims to eliminate delays caused by orders on which practical substitutions must be arranged.

This catalog reveals that Blackhawk remains in production on hydraulic hand jacks from 3 to 50 tons capacity; 4-ton wheeled service jacks; numerous gauge-equipped jacks; 7, 10, 20, and 50-ton "Porto-Power" hydraulic units; and "Porto-Power" maintenance and motor vehicle assortments and pipe benders.

Actually, the practical range of the line is retained — but production is scheduled only on models, within each classification, which have the greatest general service in the war effort.

As a further innovation, this single 12-page catalog replaces eight various peace-time bulletins. And, in the interest of simplifying the war-time buyer's job—it does not include use-photos and peace-time merchandising data. But it does have added specifications and answers to questions which in the past have prompted phone calls, wires and correspondence.

The catalog, No. V-43, is available from Blackhawk distributors or can be had by writing direct to Blackhawk Mfg. Co., Milwaukee, Wisc.

Transformer Loading By Annual Tests

(Continued from page 18)

However, in the event the transformer fails, and this is confined largely to the smaller sizes which are comparatively few in number, the fuse then blows and clears the transformer from the circuit. This, of course, means that the fault must be located and cleared and the transformer replaced. However, when this happens, the outage to the customers is not as long as may be inferred, for, in the majority of such cases, it is possible to tie the secondary affected, after the fault has been located and cleared, to an adjacent secondary to restore service while the transformer is being replaced.

Advantages of This Method

Further advantages accruing from this method of fusing are: (1) fuse link stocks are kept at a minimum; (2) the possibility of fusing with the wrong size link is eliminated; (3) the servicemen can carry fuse tubes already fused, or mounted in spare fuse box doors, thus minimizing the amount of work necessary on the pole.

The method of fusing has been discussed mainly from the standpoint of secondary shorts since these are one of the main sources

Percentage of Transformers Having Outages Due to Causes Indicated

Damage	Lightning	Second. Shorts and Grounds	Overload	Misc.	Unknown
Fuse Blown	0.71	0.07	0.02	0.42	0.64
Windings	0.25	0.17	0.32	0.02	0.17
Other	0.30	0.10	0	0.17	0.02

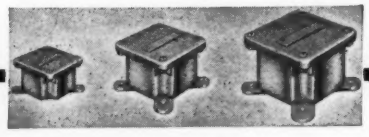
of trouble in this city. However this method has proven equally successful in keeping fuse blowings due to lightning at a minimum, and, as previously noted when discussing testing and loading of transformers, in keeping burn-outs of transformers due to overload to a small percentage.

The accompanying table, based on a total of 4,050 transformers both single-phase and three-phase connected to the 2300/4000 volt system, show the results obtained during 1942 with this method of fusing.

As might be expected in a city having 95 thunder and lightning storms during the year, lightning caused the largest percentage of outages. The large percentage attributed to miscellaneous cause was due primarily to a large number of transformer poles having been hit by vehicles and to loose connections in the primary fuse box caused by excessive vibration.

In conclusion, it may be said that the methods of testing, loading, and fusing of transformers as practiced by this utility have proven, over a period of years, to be simple, reasonably accurate and economical.

SPERO *Announces the manufacture of 9S Series Metal Enclosures for the Navy*



To meet the demand for 9S Series fittings for the U. S. Navy, the Spero Electric Corporation now offers a line of steel drawn boxes—in 3", 4" and 5" sizes, manufactured according to Navy drawings.

The following devices are available in both watertight and non-watertight units:

- Double pole switches
- Three pole switches
- Two-circuit switches
- Three-way switches
- Plug receptacles
- Push buttons
- Branch Boxes
- Junction Boxes

Specify Spero for Navy 9S fittings. Contact your nearest wholesaler.

THE SPERO ELECTRIC CORPORATION
18222 LANKEN AVE. ★ CLEVELAND, OHIO

Reconnecting Motors For Increased Capacity

(Continued from page 48)

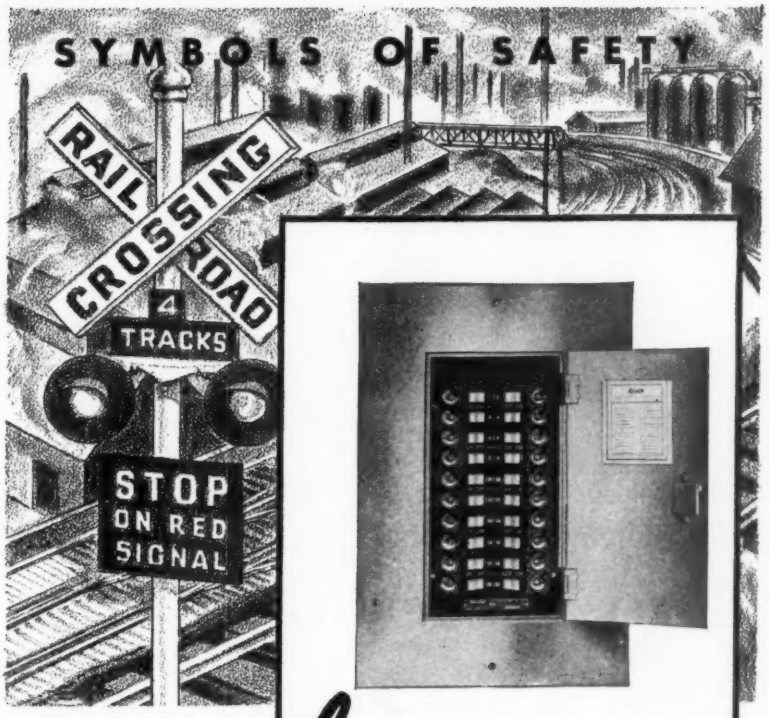
motor leads brought out for 2 phase, and nine for 3 phase, are quite common. In the case of the 3 phase ratings, internal changes must be made in order to reconnect for overvoltage by changing the type of connection from star to delta, or delta to star. For example, on a nine lead star connection, the T_7, T_8, T_9 leads have their leg of the winding connected to an internal permanent star. Likewise, on the nine lead delta connection the T_1, T_2, T_3 leads each have two winding legs connected to it. Therefore, the simplest plan on the nine lead jobs would be to revert to the old three lead when reconnecting for overvoltage.

Another method to increase rating is to increase the speed. However, on induction motors this means rewinding for a smaller number of poles, as 6 to 4, 8 to 6, etc. The smaller number of poles means that the depth of iron below the slots must be increased, otherwise the magnetic density will be too high. Before increasing the speed or changing the number of poles to a fewer number, the iron below the slots must be checked.

Changing from 6 to 4, 8 to 6, 12 to 10 poles, etc., also means that the total length of copper will be increased, the turns will be less but the area in square inches must be increased.

Thus the total effect might be increased copper weight. For example, a 6-pole, 72-slot stator might have a coil pitch of 1 and 10 or 75% pitch. Changing this winding to 4 poles would require a coil pitch of 1 and 10 or 75% pitch. This is equivalent mechanically to full pitch of the 6-pole winding and would necessitate longer coil extensions and thus increased copper length per coil.

Changing a 6-pole motor to 4-pole would mean an increase in horsepower of 1800/1200 or 50 per cent. Thus where possible such a change will produce the maximum possibilities. A change from 12 to 10 poles would produce an increase of 720/600 or 20%. In many cases a similar or greater increase can be accomplished by 10 per cent overvoltage. Likewise a change from 10 to 8 poles would mean a 25 per cent increase in rating which can also be equaled by 13



Federal PANELBOARD SAFETY FACTORS

INCREASE WAR PRODUCTION

Controlled, continuous lighting is essential for increased war production. That's why Federal panelboards are built with special safety features to insure perfect control and protection of lighting and small power circuits.

The rugged construction of Federal's low cost NTPR panelboards, for example, assures permanent alignment of working parts to reduce the danger of short circuiting. But there are many other safety features, such as—switch ahead of every fuse, floating contacts, large wiring gutters. This is true of *all* Federal Panelboards. Follow the leaders—for extra service and safety switch to Federal!

For Complete Panelboard Data

write for catalog 42. Contains all the essential facts on Federal NTPR and Mastertype panelboards.

SOUTHEASTERN REPRESENTATIVE
Fulwiler and Chapman
314 Luckie St., N. W.—Atlanta, Ga.—Jackson 2146

FEDERAL ELECTRIC PRODUCTS COMPANY
60 Parris Street Newark, N. J.

PANELBOARDS • SWITCHBOARDS • SAFETY SWITCHES • CIRCUIT BREAKERS

"GORILLA GRIPS"

A CONNECTOR FOR EVERY CONNECTION WHEREVER IT TAPS OR TERMINATES.

"SCRUWEDGE" STOCK SET

The "Scruwedge" Stock Set is the ideal way of carrying a complete inventory of small size connectors directly to the job so the electrician is ready for any emergency.

"GORILLA GRIP" STOCK SET

"Gorilla Grip" Stock Sets provide a method of stocking heavier types of lugs and mechanical connectors for emergency uses. The standard set makes 125 combinations, or a set may be built to meet your plant requirements.

Write today for "Gorilla Grip" booklet.

National Electric
PRODUCTS CORPORATION
Pittsburgh, Pa.

per cent overvoltage effect. Changing from 8 to 6 poles would mean a 33-1/3 per cent increased rating. A 20 per cent overvoltage would permit up to 44 per cent increased rating. The best range for horsepower increase from changing number of poles is in the 6 to 4 range of poles.

Thus a check on overvoltage conditions on any one motor will often open up methods of increasing the ratings.

A change from Class A insulation to full Class B, using glass insulation, or mica taped conductor, with mica and glass ground insulation, and thin glass tape for outer binder, will permit increased rating of 7 to 15 per cent above that permissible with 50°C rise ratings on Class A windings. If the copper area can be increased at the same time, then the rating can be increased one-half the per cent copper area increase.

A careful study of each motor will indicate many ways in which its rating can be increased, either by reconnecting or rewinding.

Improving Motor Shop Efficiency

(Continued from page 40)

Another factor in obtaining increased business volume, making a profit, and keeping things humming with inexperienced help under wartime conditions, was Mr. Turner's way of keeping up with the priority problem.

Every job received during the day is filed by its priority rating. In fact, no work can be done unless the priority file has been completed.

Every afternoon the work for the next day is laid out by priority card—in other words, all the AA-1s head the list and they graduate down to where a priority does not mean much.

These priority cards are kept in a Kardex file, and the entire file card represents a job. The cards stay in the file until the job has gone through the shop and is delivered to the customer,, then they are attached to the work card and filed away with all the papers pertaining to that particular job.

All cards in the file representing a job in process get a green flag. If the job is held up for any reason, such as failure of parts or supplies to arrive, the green flag is replaced with a red flag and the red flagged cards receive constant scrutiny so that the moment the job can be got going it can be tagged with green.

Each day the office selects, and turns over to the foreman, jobs having the highest priorities, listed on mimeographed forms and attached to clip board.

"We find it works best," Mr. Turner said, "to keep at least eight or ten jobs ahead on each subforeman's clip board so that he can plan his work intelligently.

With proper file records, all work, winding and priorities can be kept moving efficiently toward a completed job.

Mr. Turner found that in making so many changes from old established ways of running an armature shop, one change often led to another. Having gotten his labor trouble whipped, his women employees operating efficiently he ran into another trouble.

As explained last month the labor in the plant is operated on a subforeman system, where a trained key man is in charge of a group of comparatively inexperienced employees, or employees trained to do only a few things.

What happened was that the telephone traffic and the office caller traffic to these key men doubled and trebled. Naturally, only these men were able to talk intelligently to customers because they were the only expert electricians and trouble shooters. To put it simply while the newly trained men and women knew well enough how to do one or two operations, the subforemen and executives in the plant were the only ones who knew all about everything in their line of work. Consquently they were much in demand, and they were hard to keep track of because no one could tell instantly whether the man was in the shop, home or out on a job.

To solve this problem Mr. Turner devised the call board which is illustrated here.

Each man from the president on down is responsible for the indication on the board whether he is "in" or "out". When he comes in he pulls the plug out of the "out" hole and puts it in the "in" hole. Residence telephone numbers are also opposite the name. When a man is out, the "Information" girl can give out the home number or can call to see if the man can be located at home.

This board is located near the desk of the "Information" girl where the telephone board is located.

so that any incoming call can be serviced instantly by merely glancing at the board.

A third article in this series to be published next month will describe details of a motor washing system which reuses the solvent; how the inventory was reduced 50 per cent; how floor space was increased to take care of increase in business by the use of "jeep" buggies, which contains coils and motor parts, allowing them to be rolled off the working floor to a storage area.

New Meter Laboratory Has Novel Features

(*Continued from page 34*)

sliding glass plates. All wiring is concealed and permanently connected. Terminals are brought out on the panels to facilitate connections to instruments or standards to be tested and recalibrated from the laboratory standards.

The small instruments on the panels are utilized for trial readings before the larger and more valuable instruments are energized. Tapped switches are used to change to different ranges on the voltmeter and wattmeter. There is also located in the center of the first panel, an extended current and voltage control from the variable voltage transformer. The potentiometer at the far end of the standard side of the table is shown connected to the standard cell which is accepted as the primary standard and a basis for all measurements. It is certified periodically by the United States Bureau of Standards, at Washington, D. C.

Conservation Problems Faced by Utilities

(*Continued from page 34*)

not required the purchase of new transformers as the war has not had the same effect on all of our customers. By periodically checking transformers serving customers whose demands for service have not been affected by the war effort, we have been able to replace large transformers, needed for expansion on the part of some of our customers with war contracts, with smaller ones to obtain sufficient transformer capacity to serve the above mentioned increases from our own system. This involves, in many cases, over-

RE-LIGHTING
the new manpower production requirement

OPERATION STUDY SHEET

Working Conditions Poor light, caused by improperly located lamps. Heavy shadows on work area confuse and slow up worker... considerable spoilage-- accident hazard.

Machine No. 349
Capacity
Size
Department

Vital to reduce rejects, increase production

Operation study sheets all too often record "poor light" as a major cause of poor quality production—of too many units that cannot pass inspection. This condition is particularly noticeable on night-shift work because—

Most plants operating today were designed and built for peacetime, *daylight* working schedules. Wartime production demands night work; and *lighting based on daylight conditions is inadequate to serve the needs of night workers.*

The answer to this problem is *re-lighting.* You can quickly, easily, and with little expense increase the efficiency of your present lighting equipment by re-locating lamps to eliminate glare and shadow, increasing lamp wattages where necessary, or installing additional equipment to insure uniform lighting levels throughout your plant. A Silv-A-King lighting engineer can tell you exactly what is necessary.

Silv-A-King has specialized in industrial lighting for 22 years. Silv-A-King quality equipment (fluorescent or incandescent) plus a Silv-A-King "engineered layout" makes an unbeatable combination.

BRIGHT LIGHT REFLECTOR COMPANY, INC.
310 Morgan Avenue, Brooklyn, N.Y.

Send for your copy of our 16-page book: "Light Is An Essential Production Tool"

SILV-A-KING
MAKES Light WORK FOR YOU

BROILKING AFTER THE WAR, MORE THAN EVER America's Finest Electric Table Broiler
INTERNATIONAL APPLIANCE CORPORATION
1027 Metropolitan Avenue, Brooklyn, N. Y.

loading some of the smaller transformers installed for the war loads. Such changes sometimes become pretty involved. For instance, in the past few weeks, we made the following changes to serve a large new customer:

We first removed three small transformers from a training school which had discontinued service. These were then installed at another location where capacity had been provided for growth which had not yet developed and three large size transformers were removed. These three large transformers were then used to serve the new customer. Work of this nature has enabled us to serve 2500 hp in new loads without purchasing transformers and has saved for the war effort about four tons of copper and nine tons of steel. We have found it necessary to purchase transformers for only a few customers whose loads were so large that we had no transformers of sufficient size installed on our system.

The necessity of conservation of copper has brought to a halt our normal program of replacing deteriorated insulated wire. We are now leaving such wire in service wherever it can be done without endangering service or the public, and in a few places where replacement is necessary for such reasons, we are either repairing it temporarily or replacing it with wire salvaged from some other part of our system. The deteriorated wire removed in such changes is then re-used at some location where it may be installed without hazard, usually on the secondary system.

Mississippi "3-C" Service Program

(Continued from page 27)

to assist "the customer" refers with equal emphasis to government and municipal customers. In addition, close personal contact will be maintained with all government, city and county officials so that the personnel of the company may be of maximum service in helping them meet and solve unusual wartime problems and to plan for the post war period. A survey will be made of all school lighting installations and will include recommendations for cleaning, proper placement and other improvements. A survey is being made at all water plants for the purpose of assisting in load molding, stopping wastage and increasing the efficiency of the plants. This activity is being accepted widely by water pumping customers.

Maintenance and repair of customer equipment will receive special emphasis. Power consultants will stress the need for proper use, maintenance, reconditioning and repair of all equipment on each customer call.

Assistance will be given the United States Engineers and government officials in locating army camps, air bases and other war projects. Assistance will be given war industries, plants which have converted either wholly or in part to the production of war materials, other industrial customers and prospective industrial customers in planning for the post war period.

Intensive training of power consultants will continue throughout the year to equip them to reach the objectives of this program.

"Victory Ideas for Industry"—Industrial Division bulletin, will be issued four times in 1943. It will carry timely suggestions to industrial customers.

Post-War Planning

Although Misssissippi Power & Light Company realizes that winning the war is the paramount obligation of every American citizen, we nevertheless recognize that every effort must be made now to assure our fighting men, as well as the agricultural, commercial and industrial population of Mississippi, that profitable peacetime jobs and markets will be available after the victory has been won. Thus, a large amount of post war planning is necessary immediately if our state is to take fullest advantage of its post war opportunities. Thus, fully aware of the need for increased income, and seeking to promote Mississippi's general agricultural, industrial, and commercial interests, our company has created a Research and Development Section of the Sales Department. A far-reaching program designed to as

NO NEED TO WAIT UNTIL
HITLER'S GOOSE IS COOKED-
CHROMALOX
FIT ANY
ELECTRIC
RANGE - NOW
with CHROMALOX
HEATFLO
REPLACEMENT RANGE UNITS
Proven "tops" in economy, endurance, easy cleaning, speed. Thousands in service long before Pearl Harbor. With clip-on adaptor rings a small stock fits all ranges. Just what every dealer needs —and what every customer wants. Write
Single replacement rings for two- and three-ring Chromalox Super-Speed units also available, for maintenance of existing units.
Save old parts of critical materials.
ATLANTA, GA.—C. B. Rogers, 1009 Peachtree St. DALLAS, Texas—L. R. Ward, 403 Southland Building Annex. RALEIGH, N. C.—W. R. Phillips.
EDWIN L. WIEGAND COMPANY, 7600 THOMAS BLVD., PITTSBURGH, PA.

sist in boosting the general welfare of Mississippi has been set in motion. Through our plan, the Research and Development Section will analyze, compile, coordinate and distribute information about the state's resources for use with interested people both inside and outside of the state, and will also assist the communities we serve in preparing for the post-war period.

The root of all Misssisippi's difficulties is the fact that ours is the lowest per capita income and the lowest standard of living (considered as a whole) of any state in the nation. Thus, coupled with the fact that Mississippi has secured only a fraction of its rightful share of war industries, is proof enough that vigorous, drastic action is necessary immediately if our state is to assume its proper place in the scheme of national prosperity.

The **personnel of** our newly created Research and Development Section have already put into execution a comprehensive, well-balanced program designed to remedy these evils and it should certainly prove a stimulating force in furthering the economic development and stability of the Magnolia State.

Equipment Conservation Occupies Sales Staff

(Continued from page 25)

Power & Light Company sales department has been giving serious consideration to the problem of post-war possibilities. This has been necessary because the government has invested more than five hundred million dollars in Arkansas in war plants, and it is the desire of the company to keep as many of these in operation as possible when the war ends. This necessarily means that the population of the company's territory has been greatly increased. And offers possibilities in all customer classifications.

Realizing that such a goal is an unusual ambition, much consideration has been given to employing an outside engineering or planning firm to make a survey and furnish recommendations for a definite post-war plan.

The Sales Department has drafted a preliminary program which embraces numerous surveys for utilization in developing a post-

THIS IS THE FIRST TIME AN ADVERTISEMENT HAS EVER APPEARED

for...

THOROUGHLY TESTED SUPERIOR THOROUGHLY PROVEN

BALLAST

. . . yet it is one of America's Best Sellers

HERE'S WHY:

1 The many outstanding features of Superior Ballast have kept Superior facilities at peak operation—one satisfied user has told another until Superior has become synonymous with *superior* ballast. Recent expansion of Superior Electrical Industries facilities will now permit the manufacture of greatly increased quantities of these Custom Built Ballasts.

2 They are streamlined for a reduction in weight and ease of installation in the Ballast channel of the fixture.

3 The ends of lamps do not blacken as readily with Superior Ballast because of an improved result in the wave-form across the lamp. More lumens output per watt are provided than with other ballast of similar design.

4 Lamps are correctly balanced with Superior Ballast — the Ballast has an inductance of advanced design.

5 Reduced stroboscopic effect with Superior Ballast eliminates eyestrain and provides a more pleasing and more comfortable effect.

write for information and details

A few users:
Mitchell Mfg. Co.
General Electric Supply Co.
Westinghouse Electric Supply Co.
Graybar Electric Co., Inc.
Ruby Lighting Co.
Electro Mfg. Co.
L. J. Segil Co.

Superior Electrical Industries' new Chicago location.

Not just an ordinary ballast — it's Custom Built throughout!

SUPERIOR ELECTRICAL INDUSTRIES

DEPT. F — 2614 W. NORTH AVENUE, CHICAGO, ILLINOIS

MANUFACTURERS OF FLUOR-O-CONTROL

QUALITY CONDENSERS, ELECTRICAL TRANSFORMERS AND SOLENOID WINDINGS OF ALL TYPES

war plan. These surveys will embrace improvements to the company's physical property, utilization of war plants in its territory for peacetime production, and many other features.

Customer Services In Wartime Program

(Continued from page 23)

Station" plan for future repairs.

This "Central Service Station" plan was established in each district office to assist customers in obtaining appliance repairs, especially those who had no regular repair dealers. This plan became very popular because of the increasing demand for appliance repairs and the decreasing number of repair dealers.

Under the plan, a customer leaves an appliance at our office for repair. The appliance is turned over to a repair dealer and when repaired is returned to our office where the customer later picks it up. In the case of major appliances, the customer merely calls our office, and we, in turn, locate a dealer to do the repair work.

Our "Trading Post" plan, maintained in all offices, was also brought to the attention of customers during each interview. This plan was established to assist customers in obtaining needed second-hand appliances as well as to assist them in disposing of appliances no longer needed.

A similar plan is now being used during interviews with commercial customers. This plan is not new other than tying it in with dealer activities.

Group Meetings

We found that the "Health for Victory" Club program, originally planned for industrial plants, could be adapted to our needs. We also learned, through experiment, that the program could be successfully carried out on a self-sustaining basis.

Through "Health for Victory" Clubs and Nutrition Centers, we assisted our customers to effectively participate in our country's program in an organized manner; emphasized the advantages enjoyed by American women through the opportunities open to them under the American Way; furnished information relative to the proper maintenance of electric appliances and wiring systems; furnished information on how and where to obtain needed appliance repairs or replacements; and provided a vehicle by which information regarding our government's health conservation, protection and maintenance plans could be effectively carried to the general public.

Clubs were formed with a registered membership of ten or more and furnished a charter by the originator of "Health for Victory" Clubs, the Westinghous Electric & Manufacturing Company.

Members attended meetings at no cost unless they wished copies of the monthly Meal Planning Guide each month at 15c per copy or made an advance payment of 85c which entitled them to a copy of all materials issued during the six meetings.

Fees collected were sufficient to cover such expenses as stage props, meeting guides, "At Your Service" books, food and other incidental expenses of the "Health for Victory" meetings.

By the end of 1942, 69 "Health for Victory" Clubs had been organized with a membership of over 2,200 women and 5 Nutrition Centers established. It is expected that about 250 "Health for Victory" Clubs will be organized during 1943 with an approximate membershrip of 10,000 to 15,000 and that OCD Nutrition Centers will be established on at least 10 additional display floors.

Dealer Development

The dealer development activity has contributed directly to our country's conservation and maintenance-of-material program, has assisted in the survival of equipment dealers, thereby contributing to the preservation of the free enterprise system; has helped to provide adequate service and equipment maintenance facilities for our customers; and has protected company resources and revenues by improving and retaining present equipment repair outlets.

We urged dealers to remain economically strong by engaging in the appliance repair business and

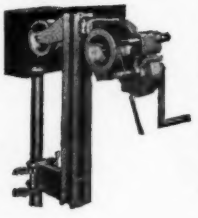
CONSERVE MANPOWER

SAVE HOURS OF WORK WITH BETTER TOOLS!

● Here are a few of the Greenlee Tools that are especially engineered to save hours of work — to conserve manpower! On many jobs they save up to 75% on time and labor costs. They are available for essential users

No. 765 CABLE PULLER

This handy Greenlee Cable Puller clamps right on to the conduit through which cable is pulled, is easily carried to the job, can be set up in a jiffy, and is easy for one man to operate with one or two cranks and will save many hours of work when pulling in cables.



COMPLETE LINE OF BENDERS

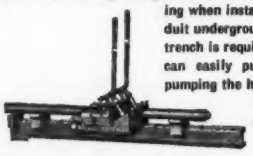
For any bending job there's a Greenlee Bender. Small hand benders and powerful hydraulic benders for conduit, pipe and tubing from ¼ to 4½-inch size. They are easily operated by one man, save the cost of many manufactured bends, and are easily carried to the job.

KNOCKOUT TOOLS

Enlarge holes without long tedious drilling, reaming and filing with Greenlee Knockout Punches and Cutters. This handy tool is inserted in a knockout or a small drilled hole and a smooth accurate hole can be quickly cut by turning the drive nut with an ordinary wrench.

HYDRAULIC PIPE PUSHERS

Greenlee Pushers eliminate digging long trenches, tearing up lawns, breaking through concrete, backfilling, and tamping when installing pipe or conduit underground. Only a short trench is required and one man can easily push the pipe by pumping the handles. Pays for itself on the first or second job.



GREENLEE TOOL CO.
1765 COLUMBIA AVE.
ROCKFORD, ILL.

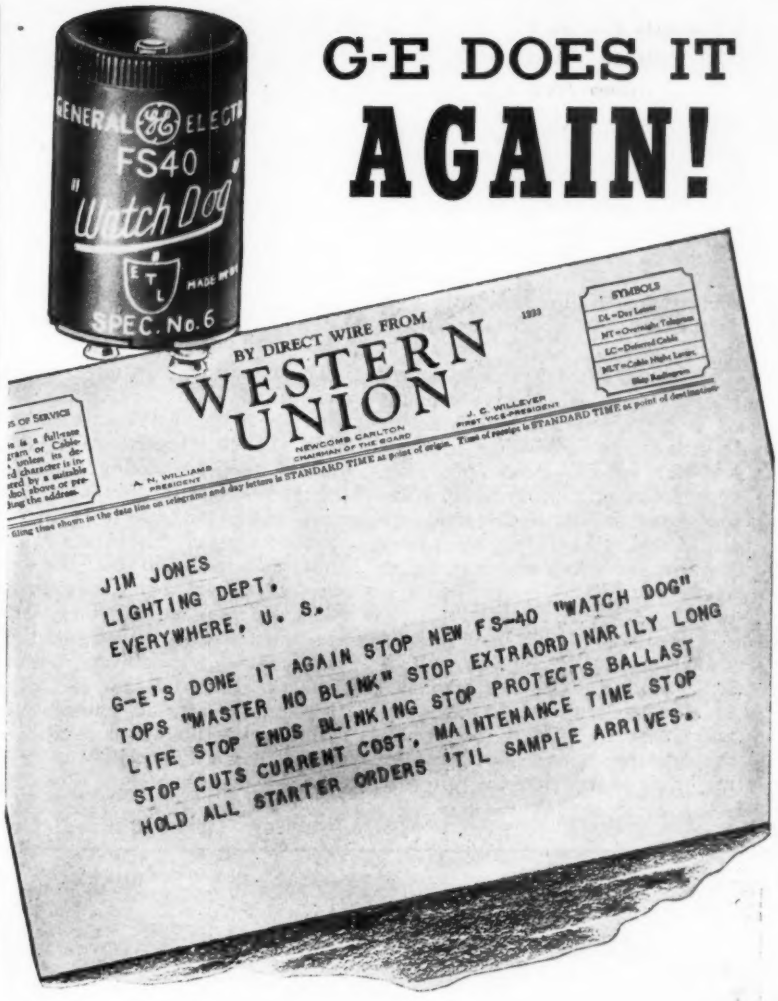
WRITE FOR FREE COPY CATALOG 33E

Find out how these and other Greenlee Tools for the Electrician, Carpenter, and Plumber can help speed up your jobs . . . write for Catalog 33E.

by handling other lines of merchandise. In order to acomplish this, we helped dealers to obtain needed personnel — men or women—from merchanical training schools, rehabilitation bureaus, etc.; we helped dealers to organize service training classes through local high schools and vocational schools; we organized and sponsored repair training classes in centrally located areas with the use of available records, films and text books; we maintained in 25 local offices, Wartime Service Files containing (a) service information, including service manuals, parts and price lists from over 50 appliance manufacturers, (b) information on other lines of merchandise, including catalogs and price lists of more than 50 manufacturers, (c) information on government war orders affecting dealer operation; we supplied dealers with "Quick Check Guides'" and other service manuals; we supplied dealers with lists of repair parts, lathes and other available tools; we supplied dealers with reprints of trade journal articles giving latest developments in equipment repairs and merchandising; we allotted appliance repair requests and Trading Post register forms to dealers according to their ability to handle them; we furnished advance copies of company appliance repair advertisements and encouraged dealer tie-in advertising; we furnished advice on all phases of dealer operations with data contained in "Developer Kits"; we furnished wartime service counter cards and window transfers; we maintained directories on company display floors listing names and addresses of all local repair firms; and we disseminated news pertaining to new methods, ideas and dealer personnel through "Dealer Sales Developer."

Close coordination was maintained with jobbers, distributors, manufacturers and trade associations. We called upon them from time to time for training assistance and materials in the interest of improving service facilities for local users of their products.

Continuous records were kept to ascertain trends and mortality among dealers and servicemen, to determine whether adequate service facilities were available for customers and to find ways and means to assist in improving such facilities.


GENERAL ELECTRIC
FS40
"Watch Dog"
SPEC. No. 6
BY DIRECT WIRE FROM
WESTERN UNION
JIM JONES
LIGHTING DEPT.
EVERYWHERE, U. S.
G-E'S DONE IT AGAIN STOP NEW FS-40 "WATCH DOG"
TOPS "MASTER NO BLINK" STOP EXTRAORDINARILY LONG
LIFE STOP ENDS BLINKING STOP EXTRAORDINARILY LONG
STOP CUTS CURRENT COST, MAINTENANCE TIME STOP
HOLD ALL STARTER ORDERS 'TIL SAMPLE ARRIVES.

G-E DOES IT AGAIN!

ONCE AGAIN, after long experimenting, G-E contributes to better, more economical and more satisfactory fluorescent lighting. The new FS-40 "Watch Dog" has everything. Here are its features:

1. Average life equivalent to the life of ten 40-watt lamps under specified test conditions.
2. Ends blinking and flickering by cutting dead lamps out of circuit.
3. Positive lock-out with all current off.
4. Long ballast life by eliminating current flow.
5. Instant lamp replacement because there's no cooling period.
6. Conserves vital war materials.
7. All of this means reduced costs to you.

For additional information write to Section 531-16, Appliance and Merchandise Dept., General Electric Co., Bridgeport, Conn.

GENERAL ELECTRIC

Transmission and Distribution Economics

(*Continued from page 21*)

control, with forced cooling and portables for peak load and emergency will reduce maintenance in even greater degree than investment, by reason of the large reduction in number of tanks, bushings, bodies of oil and accessories, less volume of oil and amount of tank and steel surfaces to be painted.

For many years it will be necessary to continue a large amount of present conventional practice in order to use present equipment and for special cases, but even so, we can still progress to some group regulation, less feeder controls, and utilize the equipment we now have to somewhat better advantage.

Distribution

Increasing distribution voltage by changing system from delta to star such as 2.3 kv to 4 kv, and 6.9 kv to 12 kv, is frequently the best opportunity we have for major improvement in economy. Practically all facilities can be used without change and seldom is very much work required on overhead lines. Losses and per cent voltage drop in three-phase mains are reduced to one third of former value.

The use of a common neutral, now generally accepted by both communication and distribution engineers as the best practice, makes this change possible, with very little net increase in conductor mileage.

The most common change, and one which yields excellent economy, is from 2.3 kv to 4 kv. This change, throughout the industry, has been taking place for thirty years, and there still remain many situations where it should be done. There are nearly always obstacles to be overcome, such as 2.3 kv generating equipment and customers motors which are star wound and cannot be reconnected, substation transformers which are star connected on high voltage side, underground cables with doubtful insulation, etc. Frequently we make the mistake of deciding that these obstacles are too great to permit us to justify the change.

This problem is such an old chestnut that to bring it up may be out of place but the following points may be worth emphasis.

The general acceptance of the common neutral has made the change more attractive.

There are cases where growing defense loads require more distribution capacity and this solution may be the most economical of material. Of three cases just completed among our client companies, one very definitely falls in this class. Although the amount of labor and total cost was somewhat greater than adding just enough feeders to get by, the change was more constructive. Instead of adding feeders one was eliminated, and the net material for reconnecting and rewinding primary motors and a synchronous condenser was practically nil. Two or three small autotransformers were required. The system has now considerable capacity for the growth expected this year.

Sometimes a pair of feeders from the same substation can be treated as one, connecting induction regulators for five per cent plus and minus instead of ten. Three regulators then take the place of present four and a circuit breaker is made available. The higher voltage helps to make this possible. If the station is attended, the situation is more favorable as a bad feeder can be quickly isolated. A few capacitors can sometimes be used to help reconcile difference in kilowatt-miles. If the paired feeders serve adjacent areas with emergency tie available both kilowatt-miles and time load characteristics can be reconciled by tying the emergency in through fuses or a reclosing device.

Under transmission, the possibility of solving the problem of star-star transformer connections by treating transmission static wire as a common neutral was mentioned. If this solution is feasible it would also eliminate in certain cases one of the obstacles to raising distribution voltage and likewise some of our phase angle problems. We know of course that star-star connections are more feasible with three-phase transformers and that tertiary windings are a solution but this does not help us on present equipment.

ONLY 2½ POUNDS OF METAL IN THE WIREWAY

Well under the three-pound steel limitation, this new Curtis Industrial Lighting Unit has a wiring channel of approximately 2½ pounds—a compact fluorescent unit for two or three 40-watt lamps.

The unit illustrated is Cat. No. 1606-C, individual unit for 2—40-watt lamps. Also in this new design are units for 3—40-watt lamps, 5 foot units for 2—100-watt lamps, and units for installation in continuous lines with either 40-watt or 100-watt lamps.

To provide flexibility in hanging, the shallow wireway can be supported by movable clamps anywhere along the channel between the ballast and the sockets. The new design has Curtis "Fluratex" non-metallic reflectors with the famous high efficiency ***Fluracite*** reflecting surface.

For complete information write us, or to the Curtis representative near you.

CURTIS LIGHTING, INC.

6135 W. 65th STREET CHICAGO, ILLINOIS

I believe we are now getting more active again on the various methods of secondary banking of transformers. We should continue our effort to solve the practical problems involved as this offers good possibilities in economy.

An interesting possibility in primary networks for light load areas is being tried out in Philadelphia. Several small substations feed a primary mesh tied together at all available points. The substations are fused on high voltage side for isolation of substation trouble. The feeder breaker is set for rather light reverse power for substation trouble and non-automatic into the primary network. The intention is to burn primary faults clear. The total substation capacity must be sufficient to burn clear the maximum conductor size used. There is good economy in this plan, but whether the practical difficulties will prove too great may still be uncertain. The point is that efforts of this kind are commendable. Many of the striking improvements made in any industrial art appear impractical at the start, and we should never be skeptical.

In closing, I again emphasize that my purpose has not been to cover the field of transmission and distribution, but to point out with a few illustrations the kind of thinking which may help us to reduce the large amount of fixed charges required for this phase of our business.

Appliance Sales Of the Future

(*Continued from page 15*)

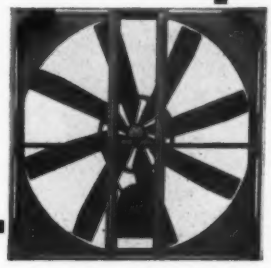
a tremendous appeal.

Production facilities and availability of material after the war may permit mass production which should be reflected in lower prices. This is especially true if builders will incorporate appliances as built-in features in houses. The housing shortage after the war will necessitate an active building program. Even though these houses be low priced, it is conceivable that the volume would still permit the incorporation of these appliances. Prefabricated houses will probably play a prominent part in this program. Obviously, the mass production savings together with the demand for labor-saving features of a home,

NO SUMMER SALES SLUMP

WITH Coolair TRADE MARK

Exhaust FANS and BLOWERS



Summer's heat always warms up cold prospects for Coolair Exhaust Fans and Blowers — that's why it will pay you to check over your prospect list — NOW!

In Army and Navy establishments, shipyards and industrial war plants, there are hundreds of operations that will be slowed up by high temperatures and poor ventilation during the coming summer months.

If you are located in a military area there are special sales opportunities offered by unsolved problems in ventilating and cooling barracks, mess halls, kitchens, hospitals, theaters and other military buildings. Contact the right man, offer your help — our help, too, if needed — and get the orders.

Check up, too, on the sales opportunities opened up by the expansion of existing war plants and the conversion of other industrial plants to war production. Serious ventilating problems often arise that can be easily solved by a properly designed installation of COOLAIR Fans.

And all the while, keep your prospect file up-to-date . . . in fact, it is good business to keep two files or sets of cards — one of prospects for immediate sales — the other, of prospects for post-war sales.

To dealers not familiar with the sales and profit opportunities offered by Coolair, we will be glad to send dealership information on request.

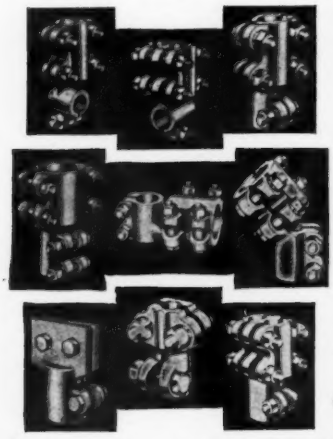
A full description of the Coolair line, with tables showing models, dimensions, performance data, etc., can be found in
SWEET'S CATALOG A.S.H.V.E. GUIDE
ELECTRICAL BUYER'S REFERENCE

AMERICAN COOLAIR CORPORATION
3604 Mayflower Street Jacksonville, Florida

"You select
EXACTLY
what you need—

— from the COMPLETE line"

Stud Connectors and Solderless Terminal Adapters for distribution and power transformers . . . for connecting to cable, pipe or bus bar . . . in line or at any angle. Connectors with reversible clamping caps take two different ranges of cable sizes. Furnished for any number of conductors. A few of Penn-Union's many types:



Also . . . the most complete line of Service Connectors, Cable Taps, Tees . . . Straight and Parallel Connectors . . . Bus Supports, Spacers . . . Grounding Clamps, Terminal Lugs, etc. etc.

Penn-Union conductor fittings are the first choice of leading utilities, industrials, electrical manufacturers and contractors—because they have found that *"Penn-Union" on a fitting is their best guarantee of Dependability.* Write for Catalog.

L. MORRIS LANDERS
309 Walton Building
ATLANTA, GA.
WALTER J. HUEMMER
Dallas Transfer & Terminal Warehouse Bldg.
DALLAS, TEXAS

PENN-UNION ELECTRIC CORPORATION
ERIE, PA.

PENN-UNION
Conductor Fittings

which means sales appeal of an appliance-equipped home, will create a new channel of distribution which we did not have before the war.

In all probability, the appliances which will first appear after the war will be 1942 models. Manufacturers have the dies and machinery preserved and ready to replace war material production as soon as government contracts are cancelled. It will be the most inexpensive and expedient way to get back into peace-time business. But during the war, new materials have appeared, new inventions have been developed, spurred on by the needs of war. We have had an opportunity to take a broad viewpoint of the needs, the possibilities and the improvement of all appliances since there have been no new yearly models. Questions have been raised as to why have we done things according to a definite routine. As a result, a multitude of new ideas have developed that will revolutionize design of appliances.

For many years after the invention of the electric lamp, we suspended sockets from the ceiling. Precedent, ingrained by the need for daily cleaning of oil lamps and for contact in lighting of gas jets, conveyed the idea that electric lamps should be readily accessible. It was not realized that the electric lamp could be controlled from a distance, that it could be enclosed in a cove or other recess without danger of fire. Being an entirely different type of light source, it could be utilized in a different manner than were other light sources.

Similarly, the electric refrigerator is different from an ice box. Consider the number of items stored in your refrigerator that would never have been kept in the ice box. The domestic refrigerator is still a box Why should it not be adapted to a waist-high cabinet to fit the other built-in cabinets in the kitchen. Drawers would provide easier access to foods. If a housewife objects to having to stoop down slightly for a lower drawer or door, witness the fact that ovens on ranges were built high for convenience at one time but I haven't heard of a housewife getting housemaids knee or even protesting seriously because ovens are built lower today.

Likewise, is it necessary that all cooking surfaces be concentrated in one appliance? This may sound radical, but is there any reason why precedent should cramp our style if convenience and economy would be achieved by having cooking units placed at strategic points in the kitchen? There are many other similar changes which designers, engineers and architects will develop that may completely change the appliance picture.

It has not been intended to prognosticate the future of appliances in this discussion. If, on the other hand, some thought has been aroused by the various points outlined herein, it may be helpful. The policies of the manufacturers, jobber, distributor, retailer, utility and individual salesmen will all be affected by the changes which are bound to come. By thinking about the trends, we can make better plans and adjust ourselves for the new era which will be tremendously interesting and full of opportunities. And again the electric industry will play a big part in further relieving drudgery and raising living standards.

SAVE STEPS IN
Saint Louis

STOP AT **HOTEL Lennox**
DOWNTOWN ON YOUR DOORSTEP
RATES FROM $3.00

Women Replace Utility Men

(*Continued from page 13*)

graduates who retained reserve commissions, and a few younger department heads. As several of these men were in training for places of greater responsibility, their loss was a serious handicap to the operation. As there is a widespread need for technically trained people, trained replacements were not readily available, and in many instances work that was formerly handled by trained engineers has been taken over by men experienced in utility work but not trained as engineers. This is particularly true in our distribution engineering section from which ten engineers have gone to the armed forces. This work is now being done by former appliance salesmen, lighting salesmen, local superintendents, etc., under the supervision of one trained engineer.

Abandonment of merchandising activities made available for other work in the organization a number of men familiar with the territory and with the company's procedure. These men have been used as replacements for men lost to the armed services. The critical housing shortage in the Charleston portion of the company's service area and the expansion of military and naval establishments has been the cause of considerable construction activity in this area. Contrasting with this, in the upstate portion of the service area construction work has declined due to shortage of critical materials. People lost to the armed services or to war industries in this area have not been replaced, and construction crews have been reduced to the minimum necessary to handle prompt restoration of service in the event of line or equipment failures. Employees available in this area above this minimum requirement are offered an opportunity to transfer to the Charleston area, and many of them have taken advantage of this opportunity thereby helping to build up the necessary additional forces in Charleston.

Women Get Men's Pay

Women workers in all cases receive the same rates of pay as the men. They are admitted to unions under the same rules and conditions as male employees, and

BURNDY SAYS: *"Stop Worrying!*

You don't need a drop of solder to make a good joint!"

Burndy left the solder pot behind over 20 years ago — and the millions of sound Burndy *solderless* connectors since put in service under every conceivable operating condition prove what a great step forward this was!

For tiny wire connections, or for the largest conductor connections for heavy current loads, Burndy *solderless* connectors replace the messy, time-wasting solder pot with simple clamping elements . . . providing SPEED and EASE and a BETTER ELECTRICAL CONNECTION.

Whatever connector problem may be bothering you today, Burndy has either solved it in 20 years of specialized engineering in this field — or will solve it for you now, with a connector custom-made to fit your needs. Call in a Burndy representative. If he can't show you time and cost savings decidedly worth-while, invite him to go fly a kite!

Burndy

the answer to your electrical connection problem

OVERHEAD · UNDERGROUND · POWER · WIRING · GROUNDING

Burndy Engineering Co., Inc., 107 Eastern Boulevard, New York City

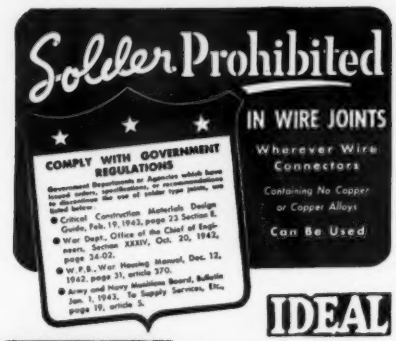
HERE'S A WAY YOU CAN CONSERVE "CRITICAL" STEEL

Briegel fittings are made with 25% *less* steel than any other fittings on the market. Approved specifically for use in concrete and interior jobs.

DISTRIBUTED BY

The M. B. Austin Co. Chicago, Ill.
Clayton Mark & Co. Evanston, Ill.
Clifton Conduit Co. Jersey City, N. J.
General Electric Co. Bridgeport, Conn.
The Steelduct Co. Youngstown, Ohio
Enameled Metals Pittsburgh, Pa.
National Enameling & Mfg. Co. Pittsburgh, Pa.
Triangle Conduit & Cable Co. New Brunswick, N. J.

BRIEGEL METHOD TOOL CO., Galva, Ill.



Wire-Nuts

Solderless, Tapeless Wire Connectors

MEET ALL GOVERNMENT REQUIREMENTS

By discontinuing the use of wire joints which require either Solder, Copper or Copper Alloys, you help conserve critical metals and comply with Government Agency Regulations.

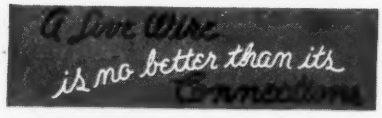
IDEAL "WIRE-CONNECTORS"

An Alternate and Improvement for Solder and Tape

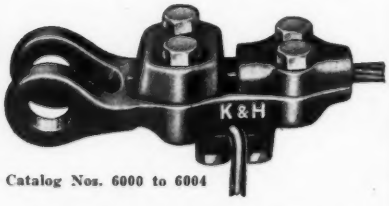
IDEAL "WIRE-NUTS" require no solder, copper or copper alloys, therefore meet all requirements. Easy to apply; *Strip wires, Screw on, That's all!* Cut Costs—Speed War work. Sizes for all joints from two No. 18 to three No. 10, Solid or Stranded Wires. Millions in use. LEADING JOBBERS WILL FURNISH SAMPLES. AVAILABLE FOR IMMEDIATE DELIVERY.

IDEAL SOLD THROUGH JOBBERS

IDEAL COMMUATOR DRESSER COMPANY
1017 Park Avenue Sycamore, Illinois



DEAD END CLAMPS
for Aluminum Line



Catalog Nos. 6000 to 6004

Protects Aluminum Strands Against Crushing . . . Grips Steel Core Separately . . . Provides Bi-Metal Tap-Off Connector

Grip will withstand a tensile strain on the cable equal to its rated strength without injury to either the core or the aluminum strands. Easily attached. Capacity No. 4 to 4/0 Solid Core.

★ WRITE FOR BULLETIN 12-A ★

K&H KRUEGER & HUDEPOHL
Solderless Terminal Lugs and Connectors
VINE AT THIRD-ES • CINCINNATI, OHIO

work under the same conditions. When evening shifts or night work falls to their lot, they work as male employees would work. The bus garage service line employs three women as service employees who start work at 7 P. M. and work until 4:30 A.M. Where stock rooms are open 24 hours a day, women stock clerks work the various shifts just as male employees work them. Women bus operators and conductors receive their assignments on a seniority basis and work the runs as drawn and on all classes of equipment. Women operate runs leaving the garage at 2:45 A.M. for the United States Navy Yard, returning to the garage about 4 A. M. Appliance repairwomen work on appliances in the customers homes as well as in the shop.

One of the problems encountered in the employment of women is the provision of additional locker and washroom facilities. In the present critical materials situation these additions may represent a substantial problem. In Charleston it was necessary to add locker room and wash room facilities at the gas plant and at the bus garage. At the bus garage, also, a lounge is available for those waiting for assignments.

All women employees are uniformed. Bus operators and conductors wear skirt, jacket, and overseas cap. Women working in shops wear coveralls designed by the Allis-Chalmers Company and made available to their women employees through Sears-Roebuck Company and Montgomery-Ward. Both are required to wear low heel, closed toed shoes. Coveralls are paid for by the company except in the case af the bus operators who purchase their own. One of the problems encountered is the difficulty of keeping women warm in cold weather and in some instances coats must be worn over the uniforms.

The company's present practice is not to employ single men, or married men without children, between the ages of eighteen and thirty-eight unless they are unfit for military service. In contrast to the previous practice of not employing physically handicapped workers, men are now being employed who have one leg, one eye, and other physical handicaps formerly considered of sufficient importance to prevent employment. These men are not permitted to perform hazardous work, but there are many places in the organization where their services can be utilized. Deferment is being requested for men now in the organization subject to military service for such time as is necessary to train replacements.

Utility Wartime Aid Program

(Continued from page 12)

ing the post water supply systems is also offered to Army posts in its service area.

One of the other utility companies, namely, the Mississippi Power and Light Company, is able to offer aid in the operation of gas systems as well as electric distribution systems to Army posts in its service area.

At the time of the visits to the Army posts, the officer in charge of electrical utilities (post engineer) was furnished a letter giving names, addresses and phone numbers of nearby power company men who are available to give technical advice or who, in time of emergency, can arrange for

Keeping pace with
UNCLE SAM

You can't go *"all-out"* when you're *"all-in"*... the comfortable, noise-proofed rooms and inner-spring mattresses at Hotel Mayfair renew your energy.

hotel Mayfair
ALL ROOMS NOISE-PROOFED
RATES FROM $3.00

crews, trucks and equipment to be sent to the aid of the post. The men selected to act as coordinators are responsible supervisors with considerable operating and maintenance experience.

A report, covering the visits to the twenty-five Army posts, and including descriptions of each participating utility company as well as outlining the program for each post, has been prepared. This report, confidential in nature, consisting of 96 pages of text and 33 exhibits, has been forwarded to the U. S. Army Corps of Engineers. Appropriate sections of the report were furnished each of the Post Engineers.

As concrete examples of the aid given to Army posts by utility companies in the area coordinated by Alabama Powr Company under this program, the following few typical cases are cited:

(1.) Test instruments were loaned so that line load and voltage tests could be made.

(2.) An emergency overhead feeder was strung to take the place of a failed underground main feeder.

(3.) Utility line crews, on emergency basis, untangled primary circuits, replaced poles and restored service after interruptions caused by truck hitting main line pole and airplane tearing out several spans of main feeder.

(4.) Survey was made of water supply system and recommendations given regarding improvement of supply.

(5.) A gang operated switch was loaned for trial blackout.

(6.) Surplus materials were sold at cost to complete post system.

(7.) Tentative studies were made for addition of sectionalizing fuses.

(8.) Post engineer and his assistants were invited to attend company safety meetings preliminary to setting up own safety program.

(9.) Maintenance schedule for oil circuit breakers was suggested.

(10.) A failed transformer was removed by utility company crew and service restored by installation of transformer loaned from stock of utility company.

(11.) Primary circuits were phased out by utility crews.

(12.) Utility engineers designed scheme for remote control of oil circuit breakers for blackouts.

(13.) Source of trouble discovered and corrected on protective fence lighting layout.

(14.) Transformers, to extent of 300 kva, loaned to get new facilities into operation without delay.

(15.) Tests were made on relays and recommendations made as to proper settings.

In addition to these specific cases there has been considerable general engineering aid given on both the gas and electric systems in the various posts.

Frequent contacts with the various post engineers by the power company coordinators keeps this program current and up to date.

As can be seen from the foregoing, this program is a substantial and far reaching contribution to the war effort. It proves again that the electric industry is anxious to assume its full share in the war effort. It has made the Army officers in charge of the

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LLOYD STARTERS hold first place for efficiency and long life wherever 100-watt lamps are used. They have longer life . . . start more surely more times.

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ALTHOUGH WAR TIME CONSTRUCTED THEY STILL GIVE THEIR USUAL EFFICIENT, ECONOMICAL PERFORMANCE WITH THEIR LONG LIFE LOW WATTS DENSITY HEATING UNIT, THEIR POSITIVE SNAP ACTION THERMOSTAT AND MOST EFFICIENT HEAT INSULATION MANUFACTURED AND GUARANTEED BY

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electrical installations on these posts feel more secure knowing that expert advice and efficient aid is near at hand. Our own employees, too, being called upon to aid these posts, realize more fully the essential nature of the industry for which they are working.

Many collateral benefits are to be derived from the program, such as the increase in good will toward the industry as a whole and the increase in the use of electric equipment and power. Most important, this program has resulted in the saving of many, many pounds of critical materials, since the Army posts can rely on utility material stocks in emergencies, thus eliminating the practice of each post maintaining a large surplus material stock.

Georgia's Customer Service Program

(*Continued from page 10*)

of a company representative, because of wartime transportation shortages and the size of the service staff. Emphasis in the ads was placed on the free helpfulness of representatives when they visit homemakers on a house-to-house schedule.

Appliance repairmen and officials have welcomed the new customer service program because the handling of many minor repairs by the customer service and home service representatives free repairmen to do the major repair jobs on large and small appliances. The reporting of major repair jobs by the representatives, after making customer calls, speed necessary repairs by the repairmen and save them valuable time and transportation.

Instructions of customers in the renewal of fuses and more intelligent use of their wiring systems results in fewer service calls for such matters. This, too, saves much mileage and manpower.

Service schools for all Georgia Power appliance repairmen were held last month to refresh them on most economical and efficient methods of repairing and servicing all sorts of electric appliances and equipment. Critical refrigeration equipment commanded the spotlight. Both district and division schools were held under the supervision of W. D. O'Brien, appliance repair supervisor.

Employees of electric dealers were invited to the appliance repair and service schoools, and many attended. The Georgia Power Company is encouraging dealers to start up and maintain appliance service departments. Dealers are furnished information on repair parts sources, government regulations and other subjects by representatives of the company.

The Industrial Development, Industrial Power, Lighting Engineering, and Rural Service divisions of the Georgia Power Company are keyed up to the needs for special wartime assistance by the various classes of customers. They are busy helping customers utilize electric service to the best advantage during this emergency.

The whole program appears to be fulfilling the prophecy of P. S. Arkwright, the president of the Georgia utility. When the customer service program was launched at six division employee meetings early in January, he said:

"In this period when sales activities have stopped and ordinary expansion has been suspended, what better job could we do than make a more determined effort to satisfy our customers? If we try, we can find new ways of being useful to them. If we search, we can discover what actions of ours in the past may have displeased them. If we want to do it and make the effort, we can remove the frictions and add to the satisfactions. And what better time is there for an effort like that than during a war, when all of us need the help that the other man can give and all of us have the duty to help in whatever way we can?

"If we make ourselves truly useful to the public, I am not worried that the public will desert us. The best safeguard against having our business taken away from us is to make the public so well-pleased with our service they will not want anybody else to serve them but us. The Georgia Power Company has made big progress in winning public approval in recent years, and whether we continue to make progress lies within our own power."

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ARE AVAILABLE
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TEST INSULATION THE MODERN, EASY WAY WITH A
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No more tiresome cranking of a hand-driven generator . . .
OUR NEW BATTERY-VIBRATOR TYPE INSULATION TESTERS OPERATE AT A
STEADY TEST POTENTIAL OF 500 VOLTS DC
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The Ward Leonard Rheostat shown on this International Blood Plasma Centrifuge was selected as the motor control because of its dependability, its many accurate steps, and its electrical interlock which assures a slow start irrespective of when the switch is closed.

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"HANDBOOK OF INTERIOR WIRING DESIGN"

THIS valuable handbook is the first standard of wiring adequacy equally acceptable to all branches of the electrical industry and is sponsored by the eight National Associations. It fills a long-felt need in dealing with the problem of inadequacy in wiring capacity and the handicap it places on electrical progress.

In preparing this Handbook, the authors endeavored to create a reference book of value to the designer of those installations not normally handled by a consulting electrical engineer or by firms that undertake large special structures and maintain engineering staffs.

In general, the Handbook discusses "why" adequate wiring is needed, "what" must be installed to supply those needs, and "where" it should be placed. It is distinctly not a booklet on "how" to wire in the sense of covering specific wiring materials and their installation. Every effort has been made to include all of the factors that enter into the smaller job while only an outline of procedure has been given for larger installations.

This valuable handbook may be secured with a three year subscription to ELECTRICAL SOUTH for $2.50 or with a five year subscription for $3.50.

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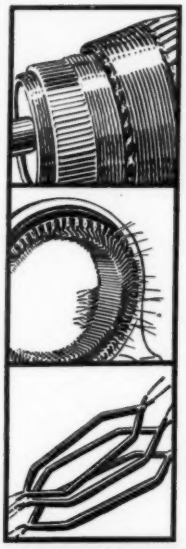

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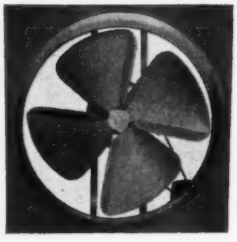

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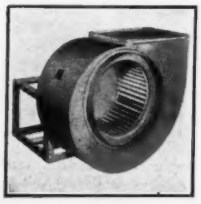

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Anaconda Wire & Cable Co.
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Bright Light Reflector Co., Inc.
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Bull Dog Electric Products Co.
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Curtis Lighting, Inc.

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